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Remarks on the exotic flora of Capo Mortola (Ventimiglia, northern Italy) and its changes over time

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Abstract

In this study, we compared current data and data of the census made in the 1990s related to the vascular flora of Capo Mortola (Ventimiglia, Italy), considering 270 taxa not dependent on crop management. The current status reported 198 alien species: 5 invasive, 65 naturalized 75 casual, 38 occurring as casual in human-dominated systems, but without direct intervention by humans and not close to parent plant, 15 occurring as casual alien, but still with some uncertainties for a definitive classification, and plus 3 cryptogenic and 1 eradicated (extinct) taxa, while in 1996 were 229 species: 87 naturalized and 142 adventitious (casual). Of these, 40 taxa show an increasing trend and 41 a decreasing or disappearing trend. If we consider the wild areas of Capo Mortola, 10 taxa are new to the Italian flora (7 casual and 3 naturalized) while 13 are new to the Ligurian flora only (all casual). If we also consider the neglected areas of the Botanical Gardens, 18 new casual species for the Italian flora and 10 for the Ligurian one would be added. In addition, 9 status changes are proposed on a national scale and 17 on a regional scale. An in-depth analysis was conducted on the presence and the local history of a subset of 34 exotic plants, 11 of which are new or have a new status for the Italian flora.

Keywords

Exotic taxa, flora, invasive alien species, Italy, Liguria

Introduction

The Italian exotic flora has been the subject of numerous studies. It has received increasing attention in recent decades due to the awareness of the threat that invasive alien species represent for biodiversity. In the neighbouring France, Sant and Alziar

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(2013) reconstructed the changes in the flora of the hill of the Château de Nice, an area of about 10 ha with natural, historical and landscape value, with reference to patrimonial taxa, rare, exotic or invasive, starting from 1840. For the alien species, these authors have developed comparisons starting from the study of Fritz Mader (1909). He was the first botanist to introduce the floristic invasions problem along the coastal strip, including the Riviera Ligure and the Côte d'Azur, where gardens and plant collections have reached their highest levels since the second half of the 19th century. These areas are highly vulnerable to plant invasion risk. In southeastern France, Ducatillion et al. (2015) assembled useful data for the invasion risk evaluation: out of 400 species planted initially in an arboretum, only 13 are naturalized. More recently, a working group coordinated by Cottaz (2020) updated the list of invasive species in the region Provence-Alpes-Côte d'Azur (PACA), now including 298 taxa. De Vilmorin (1950) published a report on the exotic flora acclimated on the Côte d'Azur that helps us to understand how various acclimated species of that period are today naturalized or invasive.

In Italy, the checklist of Galasso et al. (2018a) – and its subsequent updates (Galasso et al. 2018b, c, 2019a, b, 2020a, 2020b, 2021a, b) – constitutes the reference document for the records that are regularly reported in this journal. However, during the elaboration of this checklist, no information was available about the extreme western part of Liguria, close to the Italian-French border including the Giardini Botanici Hanbury (GBH) and their immediate surroundings. Probably, these authors did not report the taxa occasionally escaped from botanical gardens and private gardens. However, about half (over 10 ha) of the GBH compendium at Capo Mortola is covered by many natural habitats (such as cliffs, mixed woods, pine forests, garrigues, scrubs, arid grasslands, reeds, dry stone walls, ruins, etc.) harbouring a large number of naturalized species. Campodonico (2008) already highlighted the naturalization of many exotic species in the Riviera di Ponente and the fact that they spread "mainly *via* fertile seed dispersal by wind, water, birds, and mammals, as well as voluntary or unintentional human interventions". Recently, some authors (Guadagni et al. 2013) reported the presence of naturalized exotic species in the same area as new records, but these were already recorded in different editions of the Hanbury plant checklist.

By examining the publications and manuscripts related to this area, it is possible to reconstruct the story (introduction and naturalization process) of many exotic species in neighbouring natural and semi-natural habitats, leading to a significant increase in the checklist mentioned before. The main purposes of this report are four: I) to list the alien taxa recently found in Capo Mortola and its immediate surroundings (Fig. 2); II) to verify the categories attributed to the exotic species growing spontaneously and already reported in the last catalogue (Campodonico et al. 1996) 25 years later; III) try to understand the changes that have taken place in the exotic flora over the course of about 25 years; IV) to highlight the species new to Italy and Liguria according to the present Italian checklist (Galasso et al. 2018a).

Figure 1. The location of the study area.

Study area

Capo Mortola is a promontory on the western coast of Liguria, in the municipality of Ventimiglia, a few kilometers from the French border (Fig. 1). It includes a Regional Protected Area of about 20 ha and the western part of the Special Area of Conservation (SAC) "Capo Mortola" of about 50 ha. This SAC extends from sea level up to 260 m a.s.l. and its geographical limits have the following coordinates: 43°46'45.0"N, 7°32'32.7"E and 43°47'21.2"N, 7°33'30.1"E.

The study area includes the entire surface of the compendium of the GBH: about half of this compendium is dominated by natural and semi-natural habitats such as cliffs, mixed woods, pine forests, garrigues, scrubs, arid grasslands, reeds, dry stone walls, ruins, and the remaining part is cultivated as a garden (with exotic plant collections), but it also includes some natural sectors subject to minimal gardening activities (mowing). A cycling / pedestrian path that follows the ancient Roman road runs in a trench outside the botanical gardens, cutting the compendium in two from east to west. The study area is represented within the brown line in Fig. 2 and includes the inhabited area of Mortola Inferiore and the natural or cultivated areas outside the GBH, located to the west, north

and east of these. Fig. 2 shows the map of the vegetation and land use of the study area; Fig. 3 shows some examples of the natural and semi-natural habitats of the study area.

The study area has a Mediterranean pluviseasonal oceanic bioclimate with upper thermomediterranean thermotype and dry ombrotype (Rivas Martínez et al. 2011; Pesaresi et al. 2014, 2017), with an average annual temperature of *ca*. 16 °C and an average annual rainfall of *ca*. 800 mm. The driest month is July (18 mm), while November is the rainiest month with an average of 121 mm; the average temperature in the hottest month of the year (July) is 23.3 °C while the average temperature during the coldest month (January) is 9.2 °C. The area has passed through several changes over the last centuries; in the lower portion it is still possible to see a stretch of the ancient

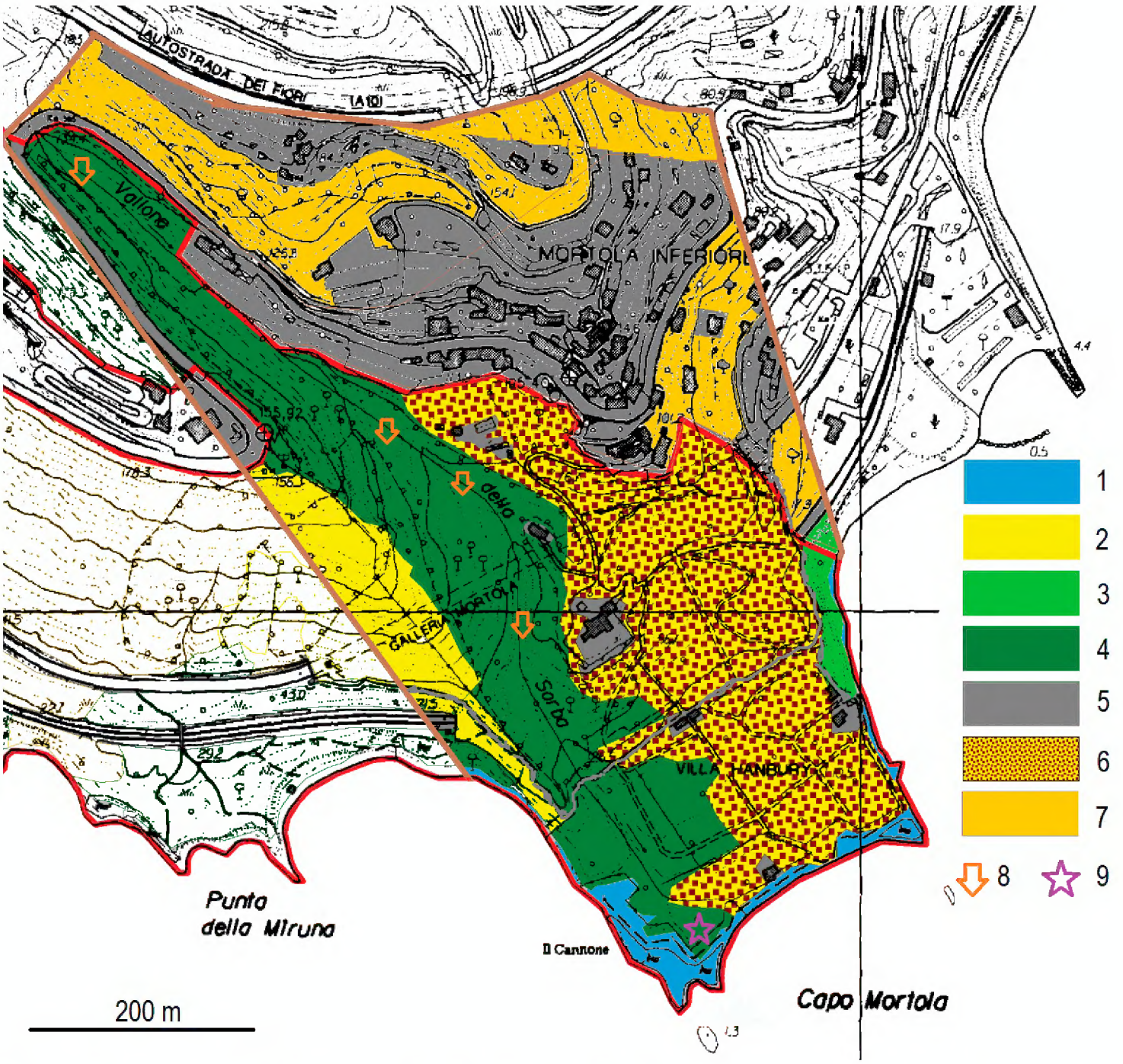

Figure 2. Vegetation and land use of the study area. 1: discontinuous communities of sea cliffs, seashores and bare rocks; 2: arid grasslands, garrigues and scrubs; 3: holm oak bushes; 4: forests dominated by pines; 5: settled areas (including roads, and greenhouses); 6: agricultural mosaic, with cultivated garden, dry stone walls, paths and semi-natural or abandoned areas; 7: olive groves; 8: riparian woods; 9: reed. The study area is bounded by the coastline and falls within the brown line. The red line marks the western part of the SAC.

Roman road, Via Iulia Augusta. The superficial hydrographical network is characterized by the lower half of the Vallone della Sorba stream; the acclivity is around 45% in the upper portion and on the western side of the Cape, which decreases in the lower portion up to values of just over 10% and with sub-flat zones. The two sides of the syncline of Capo Mortola are very well exposed with bioclastic limestones (Capo Mortola Calcarenites) while the core of the grey blue marls (Olivetta San Michele Silty Marls) have almost completely been obliterated by several terraces. Along the north side of the area some weakly cemented yellowish sands are detected (Faccini et al. 2015). A more detailed description of the area is available in the illustrative report of the SAC management plan adopted in 2016 (Mariotti et al. 2016).

The GBH were created starting from 1867 by the supervision of its founder Sir Thomas Hanbury (1832–1907), who bought the building and the surrounding areas with the goal to acclimate species of rare plants and plants with high pharmacological interest coming from warm-temperate regions all over the world. He was supported by his brother Daniel Hanbury (1825–1875), pharmacologist and botanist, and by Ludwig Winter (1846–1912), a German botanist and landscape architect. Scientific activities began in 1880. The GBH, the regional protected area and the SAC Capo Mortola are currently managed by Università degli Studi di Genova. The progression and changes in

Figure 3. Examples of the natural and semi-natural habitats of the study area. Above: cliff and scrub; below: riparian forest and pine forest.

the plant collections are the result of intense exchanges and purchases made by Thomas and the curators of the botanical gardens who followed one another, in particular Gustav Cronemeyer (?1832–1892), Kurt Dinter (1868–1945) and especially, Alwin Berger (1871–1931), during the first phase of the history of the gardens, which ended in 1907 with Thomas's death (Mariotti and Minuto 2017). Even in the subsequent phases, under the care of Thomas' son, Cecil, and daughter-in-law Dorothy, and during the post-war recovery initially curated by Onorato Masera and, later, by the curators and directors of the Università degli Studi di Genova (Pier Giorgio Campodonico, Salvatore Gentile, Paola Profumo and others) the collections had fluctuating trends, with significant new entries and losses of species and varieties (Campodonico et al. 1999a, b; Zappa and Campodonico 2005, 2006, 2007; Campodonico and Zappa 2006; Zappa et al. 2010, 2011, 2014, 2019; Mariotti and Zappa 2015). Evidence of these changes can be found in the plant catalogues (Cronemayer 1889; Dinter 1897; Berger 1912; Ercoli and Lorenzi 1938; Campodonico et al. 1996), various editions of the Index Seminum (compiled by various authors from 1880 to 1939) and Sowing & Planting manuscripts (Zappa 2011; Zappa et al. 2019). Further information on the flora of Capo Mortola can be found in various publications (Berger 1905; Campodonico 1992; Gentile and Gentile 1994; Campodonico et al. 1999a, b; Zappa and Campodonico 2005, 2006, 2007; Blardoni 2016).

Methods

The compendium of GBH is an area of about 20 ha, which is continuously monitored. Not only the flora, but also meteorological data have long been collected and recently processed (Vagge et al. 2019). Native taxa and taxa whose presence is determined by direct human management were not considered here. We only considered alloctonous taxa with an autonomous reproduction and development at a distance from the cultivated parent plant, with particular regard to those that have settled in natural and semi-natural habitats. They are mainly represented by mixed woods, scrubs and garrigues of the Vallone della Sorba, by mown lawns near the sea and by stone walls of the terraces and the edges of the Roman road. Furthermore, inside the 9 ha indicated as Garden, there are many areas without any cultivation activities; species growing exclusively in areas maintained with cultivation activities were not considered. The search for alien plants was then extended outside the GBH on a surrounding area of about 15 ha, including settlements, agricultural areas and paths, albeit with some difficulties caused by the fencing of private spaces. For the compendium, the comparison is based on the catalogue published 25 years ago by Campodonico et al. (1996), who used the following categories: acclimated (ACCL), assisted (ASS), adventive (ADV), cultivated (CULT), established / naturalized (Sptnzz./NAT), native/spontaneous (Spt./NATIVE). The meaning of these terms was defined by Campodonico (1998). We reclassified the alien taxa according to

the national standardisation system (Galasso et al. 2018a), based on the definitions provided by Richardson et al. (2000) and Pyšek et al. (2004), but supplemented by more detailed subcategories:

C cryptogenic species;
CAS occurring as a casual alien outside human-dominated systems;
CAS# occurring as a casual alien in human-dominated systems, but without direct intervention by humans and not close to parent plant;
CAS? occurring as casual alien, but still with some uncertainties for a definitive classification;
DD data deficient (unknown regional distribution or unknown alien status);
NAT occurring as a naturalized alien outside human-dominated systems;
NAT# occurring as a naturalized alien in human-dominated systems, without direct intervention by humans and not close to parent plant;
INV occurring as an invasive alien outside human-dominated systems;
ERA eradicated, eliminated during the last ten years;
+ new taxon for the Italian or the Ligurian flora;
+> new status (status change) of the taxon for the Italian or the Ligurian flora;

The nomenclature is according to Galasso et al. (2018a) and subsequent updating; taxa not included in the Portal to the Flora of Italy (2022) are named according to Plants of the World online (POWO, 2021).

Results

The Table 1 shows the 270 taxa analyzed and classified according to the status categories cited above. The list includes previous status at Capo Mortola (Campodonico et al. 1996), the status in Italy and in Liguria [Galasso et al. (2018a), updated according to Galasso et al. (2018a, b, 2019a, b, 2020a, b, 2021a, b), and according to Wikiplantbase#Liguria (Barberis et al. 2021)] and information on the trend.

We also provide some additional information and comments on a sample of 34 taxa for which we reconstructed the history of their presence in the study area.

Acacia provincialis A. Camus (Fabaceae)

+> (NAT) **ITALIA** (**LIG**): Ventimiglia (Imperia), Capo Mortola, in the Area Protetta Regionale Giardini Botanici Hanbury (WGS84: 43°46'59.66"N, 7°33'10.40"E), semi-natural evergreen post-fire shrubland in wild area of Hanbury Botanic Garden, 77 m, 1 April 2021, *M. Mariotti* (HMGBH). – Status change from casual to naturalized alien for the flora of Italy (Liguria).

Acacia provincialis is an ornamental plant native to South Australia and Victoria, introduced in Tasmania; in Europe, it is recorded in France and Italy, where it has been introduced for ornamental and environmental purposes. The species was described by Camus in 1927 from cultivated material at Pampelonne, Ramatuelle, in the south of France (PACA), where the plant had been in cultivation since the 1870s and was popular in the cut flower trade as noted by Vilmorin (1893), Anonymous (1919), and Stapf and Ballard (1929). According to O'Leary (2007) in his review of *Acacia retinodes* Schltdl. and closely related species, *A. uncifolia* (J.M.Black) O'Leary and *A. provincialis*, since the description the species was confused with these related taxa. In Italy, all specimens previously attributed to *A. retinodes* must be referred to *A. provincialis* (Galasso et al. 2018a).

In autumn 1867, a few months after the establishment of the garden, plants labelled as *A. retinodes* were introduced to La Mortola from Charles Huber's nursery-garden in Hyères. *A. retinodes* was recorded in all the catalogues of plants growing at La Mortola in Sir Thomas Hanbury's Garden: Cronemayer (1889), Dinter (1897), Berger (1912), Ercoli and Lorenzi (1938), Campodonico et al. (1996); in the last edition of Hortus Mortolensis (Campodonico et al. 1996) the species is reported as established ("Sptnzz."). It has been established for several years, as shown by the various editions of the Index Seminum (various authors 1890–1939).

We carefully examined our specimens according O'Leary's review, in particular many of the principal morphological features that allow to distinguish the three related species *A. retinodes*, *A. uncifolia*, and *A. provincialis*. Based on variable length of phyllodes, spacing of phyllodes along stem (uncrowded), long flowering time, number of flowers/head, and pod width we were able to identify the specimens as *A. provincialis*.

All specimens examined grow in the wild in a valley at La Mortola and have to be referred to *A. provincialis*; the species is widespread in a wild area of the Vallone della Sorba, in a post-fire Mediterranean shrubland community, locally with *A. longifolia* (Andrews) Willd., *Eucalyptus* sp. and *Searsia pallens*, as well as with native species of the maquis.

Acer oblongum Wall. ex DC. (Sapindaceae)

(CAS#): Ventimiglia (Imperia), Capo Mortola, in the Area Protetta Regionale Giardini Botanici Hanbury (WGS84: 43°47'1.55"N, 7°33'20.48"E), exotic evergreen woodland, 50 m, 12 August 2021, *E. Zappa*, *F. Pastor* (HMGBH). – Casual alien species confirmed for the flora of the compendium.

Acer oblongum is an ornamental plant with native range from NE-Pakistan to C- and S-China and Indo-China, which is widely cultivated for gardens and bonsai. It was introduced in the GBH from seeds obtained from Villa Thuret (Antibes, France) – sent on 3rd January 1870 – (Sowing & Planting 3, manuscript) – and it is recorded in the 1889, 1897, 1912, 1938, and 1996 Catalogues. Campodonico et al. (1996) in Hortus Mortolensis recorded the species as adventive. One old specimen grows in the central area of GBH, near the Dragon's Fountain. Young plants are widespread in the surrounding neglected slopes, in semi-shade positions without any human cultivation; these plantlets

are periodically removed to prevent further development. The species is recorded in various editions of the Index Seminum (since 1890 and following). Albericci et al. (2011) recorded a monumental tree of *Acer oblongum* in the Parco Gropallo (Genova, Italy), not found elsewhere in Italy with this size and age; they do not mention the possible naturalization of this species, but highlight its ability to adapt to the Mediterranean climate.

Alectryon tomentosus (F.Muell.) Radlk. (Sapindaceae)

+ (CAS) **ITALIA** (**LIG**): Ventimiglia (Imperia), Capo Mortola, in the Area Protetta Regionale Giardini Botanici Hanbury (WGS84: 43°46'59.62"N, 7°33'22.62"E), exotic evergreen woodland, 40 m, 12 August 2021, *E. Zappa* (HMGBH); *ibidem*, Capo Mortola, Strada Romana (WGS84: 43°46'57.11"N, 7°33'21.91"E), wall above the ancient Roman Road, 22 m, 3 March 2022, *E. Zappa* (HMGBH). – Casual alien species new for the flora of Italy (Liguria).

Alectryon tomentosus is an ornamental plant, native to New South Wales and Queensland (Australia) that occurs naturally in rainforests; it commonly sprouts in Australian urban bushland, gardens, and roadsides. It is extremely hardy and can withstand dry periods and neglect (http://www.brisrain.org.au/01_cms/details.asp?ID=19). In the 19th century, it was introduced as seed from the Royal Botanic Gardens Sidney (4th July 1898) to La Mortola (Sowing & Planting 6, manuscript); it is recorded in 1912, 1938 and 1996 Hortus Mortolensis; in the last edition of Hortus Mortolensis (Campodonico et al. 1996) the species is reported as adventive. The species is recorded in various editions of the Index Seminum (since 1912 and following). One old specimen grows in the "Australian Wood"; many young plants originating from the seeds produced by *planta culta* are widespread in the garden, in shady and semi-shade positions, especially in evergreen woodlands of the compendium; we observed a few individuals outside the botanical garden on the wall alongside the Strada Romana.

Asparagus virgatus Baker (Asparagaceae)

(CAS#): Ventimiglia (Imperia), Capo Mortola, in the Area Protetta Regionale Giardini Botanici Hanbury (WGS84: 43°47'2.55"N, 7°33'21.27"E), exotic woodland, 63 m, 11 February 2021, *E. Zappa* (HMGBH). – Casual alien species confirmed for the flora of the compendium.

Asparagus virgatus is an ornamental plant, native to Angola, South Africa, Malawi, Mozambique, Namibia, Tanzania, Yemen, Zambia and Zimbabwe, introduced into Queensland (Australia), Réunion, Trinidad-Tobago. In Europe, it is reported only as cultivated for ornamental purposes. At La Mortola the species was first introduced in October 1901, by Carl Ludwig Sprenger (1846–1917), Naples (Sowing & Planting 7, manuscript), and then recorded in the 1912, 1938, and 1996 catalogues. In the last edition of Hortus Mortolensis (Campodonico et al. 1996), the species is reported as adventive. In GBH *A. virgatus* grows along marginal borders, in semi-shady and sheltered, undisturbed locations.

Brachychiton discolor F.Muell. (Malvaceae)

(CAS#): Ventimiglia (Imperia), Capo Mortola, in the Area Protetta Regionale Giardini Botanici Hanbury (WGS84: 43°46'57.20"N, 7°33'21.54"E), exotic evergreen woodland, 25 m, 9 Sepember 2021, *F. Pastor* (HMGBH). – Casual alien species new for the flora of the compendium, where it was previously known only as cultivated (acclimated).

Brachychiton discolor is an ornamental tree native to New South Wales and Queensland, in dry rainforests, on well-drained slopes (Fern 2014). In Europe it was known only as ornamental since 2016, when it was recorded as casual alien in Sicilia (Raab-Straube and Raus 2016).

At la Mortola the species was first introduced in May 1893, as seeds from the Botanic Garden of Melbourne (Sowing & Planting 5, manuscript), and then recorded in 1912, 1938, and 1996 catalogues. It was described as a very handsome young tree that had not yet flowered (sub *B. luridus* C.Moore ex F.Muell.)(Berger 1912). In the last edition of Hortus Mortolensis (Campodonico et al. 1996), the species is reported as acclimated. One old specimen grows in the "Australian Wood"; some young plantlets originating from *planta culta* are widespread in the garden, in semi-shady neglected positions.

Bupleurum fruticosum L. (Apiaceae)

+> (C) **LIG**: Ventimiglia (Imperia), Capo Mortola, in the Area Protetta Regionale Giardini Botanici Hanbury (WGS84: 43°46'57"N, 7°33'16"E), evergreen woodland margins, 50 m, 12 August 2021, *E. Zappa* (HMGBH). – Species to be considered cryptogenic in Liguria.

Bupleurum fruticosum is a steno-Mediterranean species, typical of clayey slopes and stony garrigues (Pignatti et al. 2018), reported as native in Sicilia, Sardegna and Liguria (Isola Gallinara), not confirmed in Puglia (Bartolucci et al. 2018); the species is recorded as cryptogenic species in Toscana (Roma-Marzio and Peruzzi 2018) and as cryptogenic species extinct in Puglia (Roma-Marzio and Peruzzi 2018).

In Liguria, on the Isola Gallinara in front of Albenga (Savona), Béguinot (1907) observed the species only in one location and consider it among species introduced in cultivation; later Orsino (1975) recorded the species only in the highest area near the Villa and agrees with Beguinot in considering that this stand was first introduced as ornamental.

Caruel (1889) reports that *B. fruticosum* is often cultivated as ornamental in the gardens of the Italian peninsula and, in some cases, it has been erroneously considered wild, as in Nice by De Candolle according De Notaris (1844) [«*Nicaeae*, *utique*, *sed in (hortis cultum)*»].

The species occurs at Capo Mortola in evergreen wood areas. Date and origin of its introduction to the GBH is unknown: it was recorded in 1889, 1897, 1912, 1938, and 1996 catalogues. Seeds, collected from plants cited as indigenous, were available in exchange since the 1888 Index Seminum; the last edition of Hortus Mortolensis

(Campodonico et al. 1996) considers the species established ("Sptnzz."), i.e., naturalized. Furthermore, Berger (1905) did not include the species in the enumeration of the plants growing wild at La Mortola *Florula Mortolensis*.

As for Liguria, we suggest considering *B. fruticosum* a cryptogenic species for Liguria.

***Chasmanthe bicolor* (Gasp.) N.E.Br. (Iridaceae)**

+> (NAT) **LIG**: Ventimiglia (Imperia), Capo Mortola, in the Area Protetta Regionale Giardini Botanici Hanbury (WGS84: 43°47'00.0"N, 7°33'11.5"E), exotic woodland, 70 m, 18 March 2021, *E. Zappa* (HMGBH); *ibidem*, Capo Mortola, rio Sorba Valley (WGS84: 43°46'54.26"N, 7°33'16.00"E), *Pinus halepensis* woodland, 25 m, 11 March 2022, *F. Dente* (HMGBH). – Status change from casual to naturalized alien for the flora of Liguria.

Chasmanthe bicolor is an ornamental bulbous plant native to Cape Province (South Africa) and introduced to California, Great Britain (Scilly Isles), Italy (https://www.catalogueoflife.org/data/taxon/TPZZ). According GBIF Secretariat (2021a), it is recorded as introduced also in France, Portugal, New Zealand and Australia. In Italy it is recorded as naturalized alien in Campania and Sicilia, casual alien in Calabria, Lazio, Liguria, Puglia and Toscana.

In GBH it was first grown from seeds received from Villa Thuret, Antibes in January 1870 (sub *Antholyza*; Berger 1912) (Sowing & Planting 3, manuscript). It is recorded in the 1889, 1897, 1912, 1938 and 1996 Catalogues; it has been established for several years, as Berger (1912) noted: "it is now almost a weed in the garden, but useful for covering bare places under trees with a pleasant green during winter and spring". In the last edition of Hortus Mortolensis (Campodonico et al. 1996) the species is reported as established ("Sptnzz.") naturalized under the name of *C. aethiopica* (L.) N.E.Br. *C. bicolor* is widespread both in the garden, in woodland, in sunny, semi-shade and shady sheltered positions, neglected slopes and terraces and in evergreen woodland in the wild area of Vallone della Sorba.

***Chasmanthium latifolium* (Michx.) H.O.Yates (Poaceae)**

(CAS#): Ventimiglia (Imperia), Capo Mortola, in the Area Protetta Regionale Giardini Botanici Hanbury (WGS84: 43°47'1"N, 7°33'12"E), exotic woodland, 70 m, 12 August 2021, *E. Zappa* (HMGBH). – Casual alien species, new for the flora of the compendium, where it was previously recorded as cultivated.

Chasmanthium latifolium is an ornamental plant native to C-Canada, C- and E-USA to NE-Mexico, introduced to Europe in Austria and Belgium.

It was first introduced to GBH in 1994 (Hanbury Botanic Garden Accessions Register, manuscript); in the last edition of Hortus Mortolensis (Campodonico et al. 1996) the species is reported as cultivated, but in recent years it became adventive. In the GBH, the species grows wild along the edge of flowerbeds and borders, in sheltered positions.

***Chrysanthemoides monilifera* (L.) Norl. subsp. *monilifera* (Asteraceae)**

+> (NAT) **ITALIA** (**LIG**): Ventimiglia (Imperia), Capo Mortola, in the Area Protetta Regionale Giardini Botanici Hanbury (WGS84: 43°46'59.66"N, 7°33'10.40"E), semi-natural evergreen post-fire shrubland in wild area of Hanbury Botanic Garden, 80 m, 18 March 2021, *E. Zappa*, *L. Minuto* (HMGBH). – Naturalized alien species confirmed for the flora of Italy (Liguria).

Chrysanthemoides monilifera (≡ *Osteospermum moniliferum* L.) is a semi-succulent shrub 1–3 m high, native to the sandy soils of southern and southeastern South Africa, where there are six subspecies (Scott and Brown 1992). Introduced to California, Australia (Queensland, South Australia, Victoria, Western Australia), Norfolk Island, New Zealand (North Island), France, Spain, and Italy, in Sicilia where it is no longer recorded. The species is included in the CABI (2021a) invasive species database. *C. monilifera* has been both deliberately and accidentally introduced into other countries. It is known to have been introduced as a garden ornamental. Subsp. *monilifera* was introduced into Australia as an ornamental plant in the 1850s and was grown in gardens in Sydney, Melbourne and Adelaide (Parsons and Cuthbertson 1992). At La Mortola it was introduced in February 1869 from seeds given by Gustave Thuret of Antibes (Berger 1912). It is recorded in the 1889, 1897, 1912, 1938 and 1996 Hortus Mortolensis, where is reported as naturalized, and various editions of the Index Seminum since 1888. Gentile and Gentile (1994) observed the species in garrigues with *Salvia rosmarinus* Spenn. as differential species of groupings of the thermoxeric series.

***Chrysojasminum humile* (L.) Banfi (Oleaceae)**

+> (NAT) **ITALIA** (**LIG**): Ventimiglia (Imperia), Capo Mortola, in the Area Protetta Regionale Giardini Botanici Hanbury (WGS84: 43°46'57"N, 7°33'16"E), exotic woodland, 50 m, 15 July 2021, *E. Zappa*, *M. Mariotti* (HMGBH); *ibidem*, Capo Mortola, rio Sorba Valley (WGS84: 43°47'0.00"N, 7°33'12.10"E), mixed woodland of *Pinus halepensis* and exotic species, 50 m, 15 July 2021 (HMGBH). – Status change from casual to naturalized alien for the flora of Italy (Liguria).

Chrysojasminum humile is an ornamental plant native to Afghanistan, Assam, N-C-China, S-C-China, East and West Himalaya, Iran, Myanmar, Nepal, Pakistan, Tadzhikistan, Tibet, introduced to Greece, Italy, Sicilia, and Yugoslavia. In Europe, it is cultivated as ornamental and is recorded as casual alien in Italy (Galasso et al. 2018a). In GBH it is widespread in the garden, and in the wild area in rio Sorba valley.

We do not know the date and origin of its introduction to the GBH: it was recorded in the 1889, 1897, 1912, 1938 and 1996 catalogues. Seeds were available in exchange since the 1891 Index Seminum. In the last edition (Campodonico et al. 1996) the species is reported as cultivated; then it became naturalized as now it is widespread in neglected sites of the compendium, mainly in an evergreen woodland in the wild area of Vallone della Sorba, where it is common in shady locations.

***Clematis armandii* Franch. (Ranunculaceae)**

+ (CAS) **LIG**: Ventimiglia (Imperia), Capo Mortola, in the Area Protetta Regionale Giardini Botanici Hanbury (WGS84: 43°46'59.52"N, 7°33'13.72"E), exotic woodland, 52 m, 18 March 2021, *E. Zappa*, *F. Pastor* (HMGBH). – Casual alien species new for the flora of Liguria.

Clematis armandii is an ornamental plant native to N-C-China, S-C-China, SE-China, Myanmar, Tibet, Vietnam, occurring in forests, forest margins, slopes, shrubs, along streams. In Europe it is known only as cultivated. It is among the plants collected by Ernest Henry Wilson (1876–1930) for James Herbert Veitch (1868–1907) in his first expedition (1899–1902) to China (Wilson 1905) and introduced to cultivation by James Veitch & Sons Nurseries. In this nursery, plants raised from seeds, sent by Wilson in 1900, flourished for the first time in spring 1905 as reported in a note on Gardeners' Chronicle (Anonymous 1905). In his note "Recently introduced trees, shrubs & c. from Central China", Veitch (1903) assumed *C. armandii* as "the best of the several species of *Clematis* introduced by Wilson in his recent trip".

At la Mortola, a plant or cuttings of C. *meyeniana* Walp., later identified by Alwin Berger as *C. armandii* (Mottet 1921), was first introduced in 1904, October 25th (Sowing & Planting 8, manuscript) from the Royal Botanic Gardens, Kew. The species is recorded in 1912, 1938, and 1996 editions of Hortus Mortolensis. In the 1938 catalogue, the species is reported to grow from seeds collected by Wilson in China. Seeds were available in exchange since the 1917 Index Seminum. In the last edition of the catalogue (Campodonico et al. 1996), the species is reported as acclimated; then it became established as now it is widespread in an evergreen woodland in the wild area in Vallone della Sorba, where it is common in shady neglected sites.

***Enchylaena tomentosa* R.Br. (Amaranthaceae)**

+> (NAT) **ITALIA** (**LIG**): Ventimiglia (Imperia), Capo Mortola, in the Area Protetta Regionale Giardini Botanici Hanbury (WGS84: 43°46'53.89"N, 7°33'28.46"E), sunny and dry slopes on poor soil and stones, cliff, rocks, 10 m, 12 August 2021, *E. Zappa* (HMGBH). – Status change from casual to naturalized alien for the flora of Italy (Liguria).

Enchylaena tomentosa is a small shrub native to Australia and introduced into New Caledonia and Palestine. In Italy, it was recorded by Alberti (2013) as casual alien species here, on the cliff rocks of Capo Mortola. The species is widespread on the Cape, in marginal sunny rock sites and slopes.

It was first introduced to GBH in April 1903, from seeds sent by Villa Thuret (Sowing & Planting 8, manuscript); it is recorded in 1912, 1938 and 1996 editions of Hortus Mortolensis; in the last edition of Hortus Mortolensis (Campodonico et al. 1996) the species is reported as established ("Sptnzz.") naturalized.

***Ephedra altissima* Desf. (Ephedraceae)**

+ (NAT) **ITALIA** (**LIG**): Ventimiglia (Imperia), Capo Mortola, in the Area Protetta Regionale Giardini Botanici Hanbury (WGS84: 43°47'2.29"N, 7°33'20.24"E), woodland margins, walls, terraces in olive groves, 65 m, 2 February 2021, *F. Pastor* (HMGBH); *ibidem*, Capo Mortola, Discesa del Marinaio (WGS84: 43°47'2.94"N, 7°33'21.89"E), Mediterranean shrubland, neglected olive trees, 75 m, 11 March 2022, *F. Dente* (HMGBH). – Naturalized alien species new for the flora of Italy (Liguria).

Ephedra altissima is an ornamental and medicinal climbing plant, native to Algeria, Canary Islands (Tenerife), Chad, Libya, Mauritania, Morocco, Tunisia, and western Sahara. In Europe it is known only as cultivated. It was first introduced to GBH before 1870 from seeds sent by Daniel Hanbury to La Mortola (letter dated 23rd March 1870 in Winter manuscript). It is recorded in the 1889, 1897, 1912, 1938, and 1996 catalogues; it is also recorded in various editions of the Index Seminum (1890 onwards). In the last edition of Hortus Mortolensis (Campodonico et al. 1996), the species is reported as established ("Sptnzz."), apparently naturalized. *E. altissima* is widespread inside and outside the compendium, on trees and walls, in sunny and sheltered neglected sites mainly in olive grove terraces; both female and male specimens are present, probably scattered by birds. We observed the species also on olive trees in sunny sites outside the Gardens.

***Ferula communis* L. subsp. *communis* (Apiaceae)**

+> (C) **LIG**: observed at Ventimiglia (Imperia), Capo Mortola, in the Area Protetta Regionale Giardini Botanici Hanbury (WGS84: 43°47'0.30"N, 7°33'24.08"E), garrigues and arid slopes in wild areas of Hanbury Botanic Garden, widespread in the garden in sunny sites, 80 m, 2021. – Status change from native to cryptogenic for the flora of Liguria.

According to Caruel (1889), in Liguria the species occurs along the sea coast on the island of Bergeggi near Noli (datum from Giuseppe De Notaris), and on the Isola Gallinara near Albenga (datum from Antonio Bertoloni! and Giuseppe De Notaris), and in the region of Nice (France) (datum from Carlo Allioni). De Notaris (1844) reported Prof. Agostino Sassi's citation in Gallinara island and Giuseppe Berti in Bergeggi island near Noli; Ottone Penzig (handwritten notes on a copy of the volume of De Notaris (1844) kept in Genova) added Bicknell's record in Capo Mele.

At La Mortola, the species was introduced in 1868 by Daniel Hanbury on May 20th and sown near the sea and in the garden (Berger 1912). It was recorded in the 1889, 1897, 1912, 1938 and 1996 catalogues and various editions of the Index Seminum since 1888. Campodonico et al. (1996) in the last edition of Hortus Mortolensis classify the species as established ("Sptnzz.") naturalized. Marinella Zepigi uploaded on the "Acta Plantarum" portal a photo of the plant taken in Grimaldi (west of Capo Mortola) in 2008. The presence of this species, of ancient medicinal use, in the Bergeggi and Gallinara islands, once monastic settlements, lead us to assume its possible

introduction by humans in these sites, as certainly occurred at Capo Mortola. This assumption is not yet documented by solid evidence and we suggest considering the species as cryptogenic for the flora of Liguria.

Jaborosa integrifolia Lam. (Solanaceae)

(CAS#): Ventimiglia (Imperia), Capo Mortola, in the Area Protetta Regionale Giardini Botanici Hanbury (WGS84: 43°46'54.57"N, 7°33'22.45"E), grassy places in exotic woodland, 26 m, 11 November 2021, *E. Zappa* (HMGBH). – Casual alien species confirmed for the flora of the compendium.

Jaborosa integrifolia is an ornamental plant whose native range is from Brazil to N-Argentina and introduced into Alabama (USA). In Europe, it is recorded as casual alien species in Sardegna (Podda et al. 2012). At La Mortola, the species was first introduced before 1872 (Winter, manuscript); it is recorded in the 1938 and 1996 catalogues. In the last edition of Hortus Mortolensis (Campodonico et al. 1996) the species is reported as adventive. In the compendium, the species is widespread in grassy sites and alongside paths.

Jasminum mesnyi Hance (Oleaceae)

(CAS#): Ventimiglia (Imperia), Capo Mortola, in the Area Protetta Regionale Giardini Botanici Hanbury (WGS84: 43°47'0.39"N, 7°33'16.64"E), exotic woodland, 63 m, 23 April 2021, *F. Pastor* (HMGBH). – Casual alien species, new for the flora of the compendium, where it was previously known only as cultivated (acclimated).

Jasminum mesnyi is an ornamental plant native to S-C-China and Vietnam, introduced into Alabama and Florida (USA), NE-Argentina, Honduras, India, SE-Mexico, Pakistan, and western Himalaya. The species is recorded as invasive in USA, Australia, South Africa, Libya, and Iraq (GBIF Secretariat 2021b); in Italy it is recorded as casual and naturalized alien species (Galasso et al. 2018a).

J. mesnyi (sub *J. primulinum* Hemsl.) is among the plants collected by Wilson during his first trip in China in 1899–1902. In December 1903, three plants were introduced to La Mortola by Miss Ellen Willmott (Sowing & Planting 8, manuscript). The species is recorded in the 1912, 1938 and 1996 catalogues. In the last edition of Hortus Mortolensis (Campodonico et al. 1996), the species is reported as acclimated. In the compendium, we observed *J. mesnyi* growing in mixed borders and in shady and sheltered positions without direct human influence.

Koelreuteria bipinnata Franch. (Sapindaceae)

+ (CAS) **ITALIA** (**LIG**): Ventimiglia (Imperia), Capo Mortola, in the Area Protetta Regionale Giardini Botanici Hanbury (WGS84: 43°46'56.86"N, 7°33'21.23"E), exotic woodland, 20 m, 12 August 2021, *E. Zappa* (HMGBH); *ibidem*, Capo Mortola, Strada Romana (WGS84: 43°46'56.6"N, 7°33'20.4"E), 20 m, 3 March

2022, *E. Zappa* (HMGBH); *ibidem*, Capo Mortola, rio Sorba Valley (WGS84: 43°47'0.27"N, 7°33'14.21"E), evergreen woodland, 60 m, 11 March 2022, *F. Dente* (HMGBH). – Casual alien species new for the flora of Italy (Liguria).

Koelreuteria bipinnata is an ornamental plant, native to S-China, occurring in sparse forests and slopes at 400–2,500 m a.s.l. (Xia and Gadek 2007), and introduced to the USA (California, Alabama and Arkansas) (Serviss et al. 2006; International Dendrology Society 2021) It is among the plants collected by Wilson during the Veicht expedition in 1900 (Rehder and Wilson 1914). Seeds of *K. bipinnata* were introduced to La Mortola in May 1893, sent by Henry Correvon of Geneva (Switzerland) (Sowing & Planting 5, manuscript).

The species is recorded in 1912, 1938 and 1996 editions of Hortus Mortolensis. Seeds were available in exchange starting from the 1911 Index Seminum; in the last catalogue (Campodonico et al. 1996), the species is reported as adventive. Many plantlets originating from the old specimen are widespread in the compendium, in shady positions, mainly in the lower garden, known as the Piana. We observed two mature individuals growing wild, one alongside the Strada Romana and the other in Vallone della Sorba, near the stream banks.

Lavandula dentata L. (Lamiaceae)

+ (CAS) **LIG**: Ventimiglia (Imperia), Capo Mortola, in the Area Protetta Regionale Giardini Botanici Hanbury (WGS84: 43°46'58.30"N, 7°33'18.82"E), sunny sheltered positions, walls, 56 m, 2 February 2021, *F. Pastor* (HMGBH); *ibidem*, La Mortola, ex strada SS1 (WGS84: 43°47'05.3"N, 7°33'15.8"E), wall, 105 m, 3 March 2022, *F. Pastor* (HMGBH). – Casual alien species new for the flora of Liguria.

Lavandula dentata is an ornamental shrub native to Algeria, Baleares, Eritrea, Ethiopia, Morocco, Palestine, Saudi Arabia, Spain, and Yemen, naturalized elsewhere around the Mediterranean (Greece, Italy, Tunisia) as well as in Bulgaria, Canary Islands, Cape Verde, Madeira, western Australia, New Zealand, and California.

The date and origin of its introduction to the GBH remains obscure; surely it happened before 1889, as the species is reported in the 1889, 1897, 1912, 1938 and 1996 catalogues. It is also recorded in the various editions of the Index Seminum (since 1909). In the last edition of Hortus Mortolensis (Campodonico et al. 1996) the species is reported as adventive. *L. dentata* is widespread in the garden and outside in the village of La Mortola, on rocks, and walls, in sunny and sheltered positions.

Nandina domestica Thunb. (Berberidaceae)

(CAS#): Ventimiglia (Imperia), Capo Mortola, in the Area Protetta Regionale Giardini Botanici Hanbury (WGS84: 43°47'1.06"N, 7°33'16.29"E), mixed borders, 66 m, 12 August 2021, *E. Zappa* (HMGBH). – Casual alien species, new for the flora of the compendium, where it was previously known only as cultivated (acclimated).

Nandina domestica is an ornamental plant native to N-C-China, S-C-China, SE-China, and Japan; introduced into S-USA, Assam, Korea, New South Wales (Australia), and Italy. We do not know date and origin of the species' introduction to the GBH; it is surely before 1889, as the species is reported in the 1889, 1897, 1912, 1938 and 1996 catalogues. Seeds are available in various editions of the Index Seminum (since 1890 and following). In the last edition of Hortus Mortolensis (Campodonico et al. 1996) the species is reported as acclimated. Now it grows in mixed borders, in semi-shady sites, probably scattered by birds; we observed one individual under a cypress tree.

***Parrotia persica* (DC.) C.A.Mey. (Hamamelidaceae)**

+ (CAS) **ITALIA** (**LIG**): Ventimiglia (Imperia), Capo Mortola, in the Area Protetta Regionale Giardini Botanici Hanbury (WGS84: 43°47'0.00"N, 7°33'12.10"E), exotic woodland in wild area of Hanbury Botanic Garden, 60 m, 1 April 2021, *E. Zappa, M. Mariottti* (HMGBH). – Casual alien species new for the flora of Italy (Liguria).

Parrotia persica is an ornamental tree native to Iran, and Transcaucasia and introduced into Great Britain and Uzbekistan. It is not recorded in the updated checklist of the vascular flora alien to Italy (Galasso et al. 2018a). We do not know date and origin of the introduction to GBH, but it was recorded in the 1889, 1897, 1912, 1938 and 1996 catalogues. The last edition of Hortus Mortolensis (Campodonico et al. 1996) reports the species as acclimated.

At La Mortola, two plants of different age grow in an evergreen woodland with *Pinus halepensis* Mill. subsp. *halepensis* in Vallone della Sorba in the wild area of the compendium.

***Passiflora morifolia* Mast. (Passifloraceae)**

(CAS#): Ventimiglia (Imperia), Capo Mortola, in the Area Protetta Regionale Giardini Botanici Hanbury (WGS84: 43°47'3.21"N, 7°33'15.56"E), borders in exotic woodland, 83 m, 21 September 2021, *F. Pastor* (FI, HMGBH). – Casual alien species new for the flora of the compendium.

Passiflora morifolia is an ornamental plant with a native range from Mexico (Guerrero, Chiapas) to S-tropical America, introduced into Canary Islands, S-C-China, Palestine, and Zimbabwe. It has been recently introduced into Europe, mainly for ornamental purposes. In Italy, it is recorded as naturalized in Sardegna (Galasso et al. 2020a).

At La Mortola, *P. morifolia* was introduced in 1999 coming from the Botanic Gardens of Rotterdam as seeds (sub *P. brionioides* Kunth, Hanbury Botanic Garden Accessions Register, manuscript); in the same year, two plants were introduced from Giardino Boccanegra (Ventimiglia, Italy). In recent years, the species has become adventive and, from the cultivated areas, has spread into the compendium, maybe scattered by birds, and grows in marginal sites, on walls, and fallow locations.

***Pittosporum venulosum* F.Muell. (Pittosporaceae)**

+ (CAS) **ITALIA** (**LIG**): Ventimiglia (Imperia), Capo Mortola, in the Area Protetta Regionale Giardini Botanici Hanbury (WGS84: 43°47'0.0"N, 7°33'11.5"E), exotic woodland in wild area of Hanbury Botanic Garden, 75 m, 1 April 2021, *E. Zappa* (HMGBH). – Casual alien species new for the flora of Italy (Liguria).

Pittosporum venulosum (= *P. procerum* Naudin) is an ornamental tree native to Australia (East Queensland). The plants of Capo Mortola are certainly derived from the typical material of *Pittosporum procerum*. This name is reported by WFO (2021) database as ambiguous, while POWO (2021) considers it as a synonym of *P. venulosum*.

In 1899 Charles Naudin described *P. procerum* and introduced it to cultivation in Villa Thuret, Antibes (France); in 1903 and 1904 seeds were introduced from Villa Thuret to La Mortola (Sowing & Planting 8, manuscript). Seeds became available for exchange since 1912 (Index Seminum 1912). The species is recorded in the 1912, 1937 and 1996 catalogues; the last edition of Hortus Mortolensis (Campodonico et al. 1996) reports the species as acclimated. We observed some plants, in juvenile and mature phases, in Vallone della Sorba, the wild area of the compendium, in a mixed evergreen woodland with *Pinus halepensis* subsp. *halepensis*.

***Quercus coccifera* L. (Fagaceae)**

+ (C) **LIG**: Ventimiglia (Imperia), Capo Mortola, in the Area Protetta Regionale Giardini Botanici Hanbury (WGS84: 43°46'59.4"N, 7°33'24.3"E), evergreen woodland margins, 65 m, 18 March 2021, *E. Zappa*, *L. Minuto* (HMGBH). – Cryptogenic species confirmed for the flora of Liguria.

Quercus coccifera is a western Mediterranean species. Pignatti et al. (2017) according Brullo and Spampinato (2004), reported the species widespread mainly in Languedoc, Catalonia and Tunisia, in Italy only in western Liguria (0–200 m); while Bartolucci et al. (2018) recorded the species occurring in Puglia, Basilicata, Sicilia, Sardegna and doubtfully in Liguria.

Penzig (handwritten notes on a copy of the volume of De Notaris (1844) kept in Genova) reported: "Nym. Prosp. Lig.", and Ardoino's, Allioni's, Reichenbach's, Burnat's recordings of the species as very rare occurring around Nice. Parlatore (1868) reported Allioni's citation: around Nice, where it is rare. The Portal to the Flora of Italy (2022) reports this species in Liguria only with doubtful records.

The species occurs at Capo Mortola in evergreen wood and in post-fire Mediterranean shrubland community. We do not know date and origin of the introduction to the GBH: it was recorded in the 1889, 1897, 1912, 1938 and 1996 catalogues. Seeds were available in exchange since the1896 Index Seminum; the last edition of Hortus Mortolensis (Campodonico et al. 1996) reports the species as acclimated. It was not included in *Florula Mortolensis* (Berger 1905), the catalogue of all plants growing wild at La Mortola.

For Liguria, we suggest considering *Q. coccifera* as a cryptogenic species.

***Roldana petasitis* (Sims) H.Rob. & Brettell (Asteraceae)**

(NAT) **LIG**: Ventimiglia (Imperia), Capo Mortola, in the Area Protetta Regionale Giardini Botanici Hanbury (WGS84: 43°47'2.01"N, 7°33'11.76"E), evergreen woodland margins, 60 m, 15 June 2021, *F. Pastor* (HMGBH). – Naturalized alien species: further record for Liguria.

Roldana petasitis is an ornamental plant native to the Gulf of Mexico, and NE-Mexico and introduced to Azores, Canary Islands, France, Italy, Java, Madeira, Mauritius, Australia (New South Wales, Norfolk Island, Victoria), Réunion, and Spain. In Italy, it is recorded as casual alien species (Galasso et al. 2018a; Galasso et al. 2019b) in Basilicata, Lazio, Puglia and Sicilia, naturalized in Liguria (Longo 2012).

The species was reported in the 1897, 1912, 1938 and 1996 catalogues. In 1996, the species is reported in Hortus Mortolensis as acclimated (Campodonico et al. 1996); it became established in recent years. In the compendium *R. petasitis* grows along woodland edges on stream banks in Vallone della Sorba, without direct human intervention.

***Romneya coulteri* Harv. (Papaveraceae)**

(CAS#): Ventimiglia (Imperia), Capo Mortola, in the Area Protetta Regionale Giardini Botanici Hanbury (WGS84: 43°46'59.98"N, 7°33'17.95"E), exotic woodland, 58 m, 12 August 2021, *E. Zappa* (HMGBH). – Casual alien species, new for the flora of the compendium, where it was previously known only as cultivated (acclimated).

Romneya coulteri is an ornamental plant native from S-California to Mexico (N-Baja California), introduced into New South Wales, S-Australia, and W-Australia. In Europe, it is known only as cultivated.

R. coulteri was first introduced to GBH before 1897, as it is recorded in the 1897, 1912, 1938, and 1996 catalogues. In April 1899, a plant was introduced by Miss Ellen Willmott and in May 1901, seeds from the Southern California Acclimatization Association were delivered to La Mortola (Sowing & Planting 8, manuscript). In the last edition of Hortus Mortolensis (Campodonico et al. 1996), the species is reported as acclimated. In the compendium, some individuals of the species grow wild in sunny and sheltered positions lacking direct human interventions.

***Rosa banksiae* W.T.Aiton var. normalis Regel (Rosaceae)**

(+) (NAT) **ITALIA** (**LIG**): Ventimiglia (Imperia), Capo Mortola, in the Area Protetta Regionale Giardini Botanici Hanbury (WGS84: 43°47'3.14"N, 7°33'9.08"E), evergreen woodland, 80 m, 18 March 2021, *E. Zappa* (HMGBH). – Status change from casual to naturalized alien for the flora of Italy (Liguria); naturalized alien variety new for the flora of Italy (Liguria).

Rosa banksiae W.T.Aiton [var. *normalis* Regel] f. *lutescens* Voss (Rosaceae)

(+) (CAS) **ITALIA** (**LIG**): Ventimiglia (Imperia), Capo Mortola, in the Area Protetta Regionale Giardini Botanici Hanbury (WGS84: 43°47'3.47"N, 7°33'16.32"E), evergreen woodland margins, 85 m, 1 April 2021, *F. Pastor* (HMGBH); *ibidem*, Capo Mortola, rio Sorba Valley (WGS84: 43°47'4.35"N, 7°33'8.50"E), evergreen woodland, 100 m, 1 April 2021, *F. Pastor* (HMGBH). – Casual alien form new for the flora of Italy (Liguria).

Rosa banksiae is an ornamental plant, native to western mountainous half of China: Yunnan, Shensi, Kansu, Hupeh and Szechwan where it was found wild by Europeans collecting in China. The species ([var. *banksiae*] f. *banksiae*, the double-white flowered variety) was first introduced to England in 1807 by William Kerr. The yellow double flowered form ([var. *banksiae*] f. *lutea* (Lindl.) Rehder) was brought in later by John Damper Parks in 1824; under cultivation a single state of the last has been obtained, which is described and figurate in plate 7171 of Botanical Magazine. In the wild state, yellow flowers do not seem ever to occur (Henry 1902).

Rosa banksiae var. *normalis* (with single flower) is a rampant evergreen climber reaching up to 15 m or more, native to central and western China from Hubei and Gansu to Yunnan, usually at low altitudes but recorded up to 1,800 m a.s.l. It grows in valleys, by streams and rocky places, flowering from April to June. It was first introduced to Europe by Robert Drummond in 1796, and planted at Megginch Castle on Tayside, where it seldom flowered and remained unrecognized until cuttings were taken to Nice in 1905, where they flowered and were identified (Phillips and Rix 1988).

R. banksiae var. *normalis* is recorded in the 1938 and 1996 editions of Hortus Mortolensis, but it was introduced around 1912, maybe as part of the collection received from Mr. Wilson, as reported by Berger (1912). "Wilson N° 619, L.M., 2 July 1913" is written on the label of a specimen in our herbarium (HMGBH); the seeds were available in the 1913 Index Seminum.

According the forum actaplantarum.org, Franco Fenaroli recorded *R. banksiae* photographed in 2008 outside the boundary wall of a villa at Gardone Riviera (Province of Brescia) and said he had never seen it naturalized; Daniela Longo cited *R. banksiae* photographed in 2013 at Capo Mortola. Both do not provide any information on infraspecific rank. Based on the images available online, the plants photographed seem to refer to two different varieties: var. *normalis* (single flower) in Capo Mortola and var. *banksiae* (double or full flowered) in Gardone Riviera.

Campodonico et al. (1996) reported *R. banksiae* var. *normalis* as established ("Sptnzz."), as it is widespread in the compendium, mainly in the wild area in Vallone della Sorba, where is common in shady situations within the woodland, climbing on trees up to 10 m or more.

The yellow single-flowered form (f. *lutescens*) is of unknown origin and its date of introduction is not recorded. Phillips and Rix (1988) noted both the double and single forms apparently growing on the same plant in an old garden on the Riviera and explained that the single yellow may appear as a reverse sport on the commoner double. Nothing is known as to its introduction at La Mortola, but it was already cultivated before December 1870, as noted by J.V.V. (1877), by Thomas Hanbury (1878)

on Gardeners' Chronicle and by Winter (manuscript, 6th December 1870, letter to Daniel Hanbury). In the same years, as reported by Emanuele Orazio Fenzi (1878) on Gardener's Chronicle, Eugenio Baroni, chief gardener at Florence Botanic Garden, obtained yellow single flowers plant. Woodall (1878), in another note on Gardeners' Chronicle reported about single yellow form specimen in Nice and other locations in French Riviera observed in the spring of 1873 and in flower in 1876.

Berger (1912) noted that single yellow flower form was the most abundant rose in the garden of Sir T. Hanbury. *R. banksiae* f. *lutescens* is recorded in 1889, 1897, 1912, 1938 and 1996 catalogues; it has been established for several years, as shown by the various editions of the Index seminum (since 1890 and following). Campodonico et al. (1996) reported f. *lutescens* as adventive; it is widespread in the garden and in semi-natural areas of Vallone della Sorba.

***Rosa brunonii* Lindl. (Rosaceae)**

+ (NAT) **ITALIA** (**LIG**): Ventimiglia (Imperia), Capo Mortola, in the Area Protetta Regionale Giardini Botanici Hanbury (WGS84: 43°47'3.76"N, 7°33'8.61"E), evergreen woodland, 84 m, 5 April 2021, *F. Pastor* (HMGBH). – Naturalized alien species new for the flora of Italy (Liguria).

Rosa brunonii is an ornamental plant native to Afghanistan, Assam, S-C-China, East and West Himalaya, Myanmar, Nepal, Pakistan, and Tibet, introduced to Europe in 1823 as *R. napaulensis* Andrews.

We do not know date and origin of the introduction to the GBH: the species is recorded in the 1938 and 1996 editions of Hortus Mortolensis; seeds were available in exchange since the 1922 Index Seminum. In the last edition (Campodonico et al. 1996), the species is reported as established ("Sptnzz."), as it is widespread in the compendium, mainly in the wild area of Vallone della Sorba, where is common in shady situations, climbing on trees up to 15 m or more.

R. brunonii 'La Mortola' is an ornamental cultivar originated in the GBH by a sport of *R. brunonii*, first brought to England by Edward Bunyard in the 1930s (Quest-Ritson 2013) and introduced into commerce by Sunningdale Nursery in 1954 (HelpMeFind 2021).

***Searsia pallens* (Eckl. & Zeyh.) Moffett (Anacardiaceae)**

+ (CAS) **ITALIA** (**LIG**): Ventimiglia (Imperia), Capo Mortola, in the Area Protetta Regionale Giardini Botanici Hanbury (WGS84: 43°46'59.66"N, 7°33'10.40"E), semi-natural evergreen post-fire shrubland in wild area of Hanbury Botanic Garden, 77 m, 25 February 2021, *E. Zappa* (HMGBH). – Casual alien species new for the flora of Italy (Liguria).

Searsia pallens is an ornamental plant native to Botswana, South Africa, and Lesotho. In Europe it is only known as cultivated. The species was introduced to La Mortola in June 1872, as *Rhus excisa* Thunb. var. *pallens* (Eckl. & Zeyh.) Sond. by seeds received from prof. Peter Mac Owan (Berger 1912), director of the Cape Town Botanical Garden.

The species was reported in the 1889, 1897, 1912, 1938, and 1996 catalogues. Seeds became available for exchanges since 1909. Inside the boundary of the compendium, in the wild area of Vallone della Sorba, individuals of *S. pallens* occur in a post-fire Mediterranean shrubland community.

***Senecio linifolius* L. (Asteraceae)**

\+ (CAS) **ITALIA** (**LIG**): Ventimiglia (Imperia), Capo Mortola, in the Area Protetta Regionale Giardini Botanici Hanbury (WGS84: 43°47'3"N, 7°33'21"E), margins of sunny and dry slopes in Hanbury Botanic Garden, 70 m, 1 April 2021, *E. Zappa* (HMGBH); *ibidem*, Capo Mortola, Discesa del Marinaio (WGS84: 43°47'2.94"N, 7°33'21.89"E), mediterranean shrubland, 75 m, 11 March 2022, *F. Dente* (HMGBH). – Casual alien species new for the flora of Italy (Liguria).

Senecio linifolius is a small half succulent shrub native to the eastern Cape Province and Lesotho, previously known in literature with the illegitimate name *Senecio longifolius* L.

Senecio linifolius L. (Linnaeus 1759) was based on a South African collection in the herbarium of Johannes Burman (Wijnands 1983). Linnaeus (1763) later published the replacement name *S. longifolius* L. for the species to avoid homonymy with his new combination *S. linifolius* (L.) L. (Linnaeus 1763) for a Mediterranean species based on *Solidago linifolia* L. (Linnaeus 1753). The name *S. linifolius* L. [1759] is therefore correctly applied to the South African species (Calvo et al. 2013).

The species was introduced as *S. longifolius* L. to La Mortola by seeds received in June 1872, probably from Prof. Peter MacOwan (Berger 1912); it soon became subspontaneous in the garden according to Berger. It was recorded in the 1889, 1897, 1912, 1938, and 1996 catalogues; seeds became available for exchanges since the 1888 Index Seminum. In the last edition of Hortus Mortolensis, Campodonico et al. (1996) consider the species established ("Sptnzz."). We observed some plants outside the Garden on sunny and dry slope.

***Setaria palmifolia* (J.Koenig) Stapf (Poaceae)**

(CAS#): Ventimiglia (Imperia), Capo Mortola, in the Area Protetta Regionale Giardini Botanici Hanbury (WGS84: 43°46'56.92"N, 7°33'20.16"E), exotic woodland garden, 26 m, 4 February 2021, *F. Pastor* (HMGBH). – Casual alien species, new for the flora of the compendium, where it was previously known only as assisted.

Setaria palmifolia is an ornamental plant native from tropical and subtropical Asia to E-Australia, introduced to W- and S-Australia, New Zealand, Pacific Islands and S- and C-America, with sporadic records in C-Africa (GBIF Secretariat 2021c), where it has naturalized and become invasive in many new territories, especially on the Pacific islands, including Hawaii (CABI 2021b). In Europe, it is known only as cultivated. The species is recorded in the EPPO database.

We do not know date and origin of the introduction to the GBH, but it was surely before 1889, as the species was reported in the 1889, 1897, 1912, 1938, and 1996

catalogues. In the last edition of Hortus Mortolensis (Campodonico et al. 1996), the species is reported as assisted, but in recent years it became established. At La Mortola, *S. palmifolia* occurs as a weed in flowerbeds and borders, especially, but not limited to, those that are regularly watered, in sheltered positions.

***Trachelospermum jasminoides* (Lindl.) Lem. (Apocynaceae)**

(CAS#): Ventimiglia (Imperia), Capo Mortola, in the Area Protetta Regionale Giardini Botanici Hanbury (WGS84: 43°47'2.29"N, 7°33'20.24"E), sunny places on terraces in olive groves, 62 m, 15 September 2021, *F. Pastor* (HMGBH). – Casual alien species, new for the flora of the compendium, where it was previously known as acclimated.

Trachelospermum jasminoides is an ornamental plant native to N-C-China, S-C-China, SE-China, Hainan, Japan, Korea, Taiwan, Tibet, and Vietnam; it has been introduced and can be found naturalized in Pakistan, India, the USA, Mexico, C-America, and the Bahamas (Rojas-Sandoval 2017). The species is a popular garden plant in Australia, New Zealand, and Europe. In GBH it was first introduced before 1891, as it is reported in the Index Seminum since 1891 and is recorded in the 1897, 1912, 1938, and 1996 catalogues. In the last edition of Hortus Mortolensis (Campodonico et al. 1996), the species is reported as acclimated. The species grows along marginal borders, but not limited to, those that are regularly watered, in semi-shady and sheltered positions. Some young individuals grow wild on terraces of olive orchards. The cultivar 'Wilsonii', reported by Campodonico et al (1996) as adventive, is currently observed only as cultivated.

***Vachellia karroo* (Hayne) Banfi & Galasso (Fabaceae)**

+ (CAS) **LIG**: Ventimiglia (Imperia), Capo Mortola, in the Area Protetta Regionale Giardini Botanici Hanbury (WGS84: 43°46'58.70"N, 7°33'23.42"E), sunny and dry places, 12 m, 21 September 2021, *F. Pastor* (HMGBH). – Casual alien species new for flora of Liguria.

Vachellia karroo is an ornamental plant native to South Africa, Angola, Botswana, Malawi, Mozambique, Namibia, Zambia, and Zimbabwe; introduced into the Mediterranean area, Portugal, NE-Argentina, Bolivia, C-Chile, India, Iraq, Mauritius, Myanmar, Paraguay, and Australia (Queensland and Western Australia), where the species is known to behave invasively. In Europe, it is cultivated as ornamental and is recorded as casual and naturalized alien in Italy (Galasso et al. 2018a), but was recently recorded as invasive in Sardegna (Galasso et al. 2021a). In the GBH it was introduced in autumn 1867, with other acacias brought from Charles Huber's nursery-garden in Hyères (Plants sent by Hubers to the Palazzo Orengo. Dec. 1867. Manuscript, Hanbury Archives); the species was reported in the 1889, 1897, 1912, 1938, and 1996 catalogues. Seeds became available for exchanges since 1890. Campodonico et al. (1996) reported the taxa as established ("Sptnzz."). In the compendium, *V. karroo* is widespread in sunny and semi-shady dry locations, in marginal shrubland.

Table 1. Alien species of the flora of Capo Mortola and its changes observed in the last twenty-five years.

Taxon (1)	Previous names [1996] (2)	Cat 1996 (3)	2022 (4)	Trend (5)	Italian checklist (6)	Ligurian checklist (7)	Geography (8)	Notes (9)	Novelties (10)
Abies nordmanniana (Steven) Spach subsp. *nordmanniana*		ADV	–	↓	CAS	–	Cauc		
Acacia provincialis A.Camus	*Acacia retinodes* Schltdl.	NAT	NAT	≈	INV	CAS	Australia		RNS
Acacia retinodes Schltdl.		NAT	W	nr	W	–	Australia	(a)	
Acanthus arboreus Forsk.		ACCL	CAS#	↑	CAS	CAS	Arabia, Trop. Africa		
Acanthus mollis L. subsp. *mollis*		NATIVE	NAT	≈	NAT	NAT	Medit		
Acer oblongum Wall. ex DC.		ADV	CAS#	≈	–	–	China, Himalaya		(+)
Aeonium arboreum (L.) Webb & Berthel.		ACCL	NAT	↑	NAT	NAT	Canary Is	(b)	
Agave americana L. subsp. *americana*	*Agave americana* L. var. *americana*	ACCL	CAS	↑	INV	INV	Mexico		
Agave americana L. subsp. *americana* 'Marginata'	*Agave americana* L. var. *marginata* Trel.	ACCL	CAS	↑	–	–	Culta		nr
Agave fourcroydes Lem.		ASSIST	NAT	↑	INV	NAT	C-Amer	(c)	
Agave salmiana Otto ex Salm-Dyck subsp. *ferox* (K.Koch) Hochstätter		ACCL	CAS	↑	INV	NAT	Mexico		
Ageratina pazcuarensis (Kunth) R.M.King & H.Rob.	*Eupatorium haageanum* Regel & Körn.	ADV	DD	?	–	–	Not known		
Ailanthus altissima (Mill.) Swingle		NAT	INV	↑	INV	INV	China		
Ajuga orientalis L.		NAT	CAS#	↓	NATIVE	NAT	E-Medit		
Alcea rosea L.		NAT	NAT	≈	NAT	CAS	Middle East		RNS
Alectryon tomentosus (F.Muell.) Radlk.		ADV	CAS	≈	–	–	Australia		+
Aloë arborescens Mill. subsp. *arborescens*	*Aloë arborescens* Mill. var. *arborescens*	ACCL	NAT	↑	NAT	CAS	S-Afr		RNS
Aloë striata Haw. subsp. *striata* × *Aloë microstigma* Salm-Dyck subsp. *microstigma*	*Aloë striata* Haw. × *Aloë saponaria* (Aiton) Haw.	ADV	–	↓	–	–	Culta		
Aloiampelos ciliaris (Haw.) Klopper & Gideon F.Sm.	*Aloë ciliaris* Haw.	ACCL	CAS	↑	CAS	CAS	S-Afr	(d)	
Ampelodesmos mauritanicus (Poir.) T.Durand & Schinz		ADV	DD	?	NATIVE	NATIVE	W-Medit		
Anemone coronaria L.		NAT	CAS?	↓	NATIVE	NAT	E-Medit		
Anemone pavonina Lam.		ADV	CAS	≈	NAT	NAT	S-Eur		
Antirrhinum majus L.		ADV	NAT	↑	NAT	NAT	SW-Eur, N-Afr		
Araujia sericifera Brot.		ADV	CAS	≈	INV	NAT	Brazil		
Aristolochia sempervirens L.		NAT	NAT	≈	NATIVE	NAT	E-Medit		
Asarina procumbens Mill.		ADV	CAS#	≈	–	–	SW-Eur		(+)
Asclepias curassavica L.		ADV	CAS#	≈	NAT	–	S-Amer		(+)

Taxon (1)	Previous names [1996] (2)	Cat 1996 (3)	2022 (4)	Trend (5)	Italian checklist (6)	Ligurian checklist (7)	Geography (8)	Notes (9)	Novelties (10)
Asclepias physocarpa (E.Mey.) Schltr.	*Gomphocarpus physocarpus E.Mey.*	ADV	CAS	≈	NAT	–	S-Afr		R+
Asparagus aethiopicus L. 'Sprengeri'	*Asparagus densiflorus* .(Kunth) Jessop 'Sprengeri'	ADV	CAS	≈	CAS	CAS	Culta		
Asparagus asparagoides (L.) Druce	*Asparagus asparagoides* (L.) W.Wight	ADV	CAS	≈	NAT	–	S-Afr		R+
Asparagus setaceus (Kunth) Jessop		ADV	CAS	≈	NAT	–	S-Afr		R+
Asparagus virgatus Baker		ADV	CAS#	≈	–	–	S-Afr		(+)
Aubrieta columnae Guss. subsp. *columnae*		ADV	CAS	≈	NATIVE	CAS	CS-Apennines		
Aubrieta deltoidea (L.) DC.		ADV	CAS#	≈	NAT	–	S-Medit, Canary Is		R+
Azolla filiculoides Lam.		ADV	DD	?	INV	–	N-Amer		
Baccharis halimifolia L.		ADV	ERA	↓	INV	–	CN-Amer	(e)	
Bauhinia aculeata L. subsp. *grandiflora* (Juss.) Wunderlin		ACCL	CAS#	↑	–	–	SW-Amer		(+)
Bellevalia trifoliata (Ten.) Kunth		NAT	NAT	≈	NATIVE	NATIVE	CE-Medit		
Berberis sargentiana C.K.Schneid.		NAT	CAS?	↓	–	–	China		
Beta vulgaris L. subsp. *vulgaris*	*Beta vulgaris* L. subsp. *vulgaris* convar. *cicla* (L.) Alef. var. *flavescens* DC.	NAT	NAT	≈	CAS	CAS	Culta		NS
Bidens lanceolata (L.) Banfi, Galasso & Bartolucci	*Coreopsis lanceolata* L.	ADV	DD	?	NAT	–	N-Amer		
Blainvillea acmella (L.) Philipson	*Spilanthes acmella* Murray	ADV	DD	?	–	–	Trop-Subtrop		
Borago officinalis L.		NAT	NATIVE	nr	NATIVE	NATIVE	S-Eur		
Brachychiton discolor F.Muell.		ACCL	CAS#	↑	CAS	–	Australia		R(+)
Buddleja davidii Franch.		NAT	NAT	≈	INV	NAT	China		
Bupleurum fruticosum L.		NAT	C	≈	NATIVE	NATIVE	S-Eur, N-Afr		RNS
Calendula officinalis L.		NAT	NAT	≈	NAT	NAT	Unknown		
Calendula suffruticosa Vahl subsp. *algarbiensis* (Boiss.) Nyman		ADV	DD	?	–	–	Iberia		
Callianthe peruviana (Lam.) Dorr	*Abutilon arboreum* Sweet	ADV	CAS	≈	–	–	Peru		+
Campanula poscharskyana Degen		ADV	CAS	≈	NAT	CAS	S-Dalmatia		
Campsis radicans (L.) Bureau	*Campsis radicans* (L.) Seem.	ADV	CAS	≈	NAT	CAS	N-Amer		
Canarina canariensis (L.) Vatke		ADV	DD	?	–	–	Canary Is		
Capparis spinosa L.		ACCL	CAS?	↑	NATIVE	DD	Medit, S-Asia		
Carpobrotus acinaciformis (L.) L.Bolus		NAT	NAT	≈	INV	NAT	S-Afr		
Celastrus angulatus Maxim.		NAT	DD	?	–	–	China		
Celtis australis L. subsp. *australis*		ADV	CAS	≈	NATIVE	NATIVE	S-Eur, Madera		
Cercis siliquastrum L. subsp. *siliquastrum*		NAT	NAT	≈	NATIVE	CAS	Medit		RNS
Chamaeiris foetidissima (L.) Medik.	*Iris foetidissima* L.	ACCL	CAS	↑	NATIVE	NATIVE	SW-Eur, Medit		

Taxon (1)	Previous names [1996] (2)	Cat 1996 (3)	2022 (4)	Trend (5)	Italian checklist (6)	Ligurian checklist (7)	Geography (8)	Notes (9)	Novelties (10)
Chamaerops humilis L. subsp. *humilis*		NAT	NAT	≈	NATIVE	NATIVE	W-Medit		
Chasmanthe aethiopica (L.) N.E.Br.		NAT	W	nr	INV	D	S-Afr	(a)	
Chasmanthe bicolor (Gasp.) N.E.Br.	*Chasmanthe aethiopica* (L.) N.E.Br.	NAT	NAT	≈	NAT	CAS	S-Afr	(f)	RNS
Chasmanthium latifolium (Michx.) H.O.Yates	*Uniola latifolia* Michx.	CULTA	CAS#	↑	–	–	N-Amer		(+)
Chenopodium bengalense (Lam.) Spielm. ex Steud.D.Don	*Chenopodium giganteum* D.Don	NAT	DD	?	CAS	–	India, Nepal		
Chlorophytum comosum (Thunb.) Jacq.		ADV	CAS?	≈	NAT	–	S-Afr		
Chrysanthemoides monilifera (L.) Norl.		NAT	NAT	≈	NC	–	S-Afr		NS
Chrysojasminum fruticans (L.) Banfi	*Jasminum fruticans* L.	NAT	CAS	↓	NATIVE	NATIVE	S-Eur	(g)	RNS
Chrysojasminum humile (L.) Banfi	*Jasminum humile* L.	CULTA	NAT	↑	CAS	CAS	Himalaya		RNS
Cichorium intybus L. var. *foliosum* Hegi		NAT	CAS#	↓	–	–	Culta		
Cistus crispus L.		NAT	NAT	≈	NATIVE	CAS	W-Medit		RNS
Clematis armandi Franch.		ACCL	CAS	↑	CAS	–	China		R+
Cneorum tricoccon L.		ADV	CAS?	≈	NATIVE	NATIVE	W-Medit		
Cocculus laurifolius DC.		NAT	NAT	≈	–	–	SE-Asia, Jap		+
Colutea arborescens L.		ADV	CAS	≈	NATIVE	CAS	CSW-Eur		
Convolvulus sabatius Viv. subsp. *mauritanicus* (Boiss.) Murb.		ADV	CAS	≈	NAT	–	NW-Afr		R+
Coriandrum sativum L.		ADV	–	↓	NAT	–	N-Afr, Middle East		
Coronilla valentina L.	*Coronilla valentina* L. subsp. *glauca* (L.) Batt.; *Coronilla valentina* L. subsp. *valentina*	NAT	NATIVE	nr	NATIVE	NATIVE	S-Medit	(h)	
Cotinus coggygria Scop.		ADV	NATIVE	nr	NATIVE	NATIVE	CS-Eur, Asia		
Cotoneaster franchetii Bois		ACCL	CAS	↑	INV	–	China-SE-Asia	(i)	R+
Cotoneaster horizontalis Decne.		ADV	CAS?	≈	INV	NAT	China	(j)	
Cotoneaster integerrimus Medik.		NAT	NAT	≈	NATIVE	NATIVE	Eur, W-Asia		
Cotoneaster pannosus Franch.		ADV	CAS	≈	NAT	CAS	China		
Crinum bulbispermum (Burm.f.) Milne-Redh. & Schweick.		ADV	CAS#	≈	–	–	S-Afr		(+)
Cupressus sempervirens L.		NAT	NAT	≈	NAT	CAS	E-Medit		RNS
Cyclamen persicum Mill.		NAT	NAT	≈	CAS	CAS	S-Medit, Middle East	(k)	RNS
Cyrtomium falcatum (L.f.) C.Presl		ADV	CAS#	≈	NAT	NAT	Asia, India		
Cytisus filipes Webb & Berthel.	*Cytisus filipes* (Webb & Berthel.) Masf.	ADV	DD	?	–	–	Canary Is		
Danaë racemosa (L.) Moench		ACCL	DD	?	CAS	CAS	Asia Minor, Turkey, Lebanon	(l)	

Taxon (1)	Previous names [1996] (2)	Cat 1996 (3)	2022 (4)	Trend (5)	Italian checklist (6)	Ligurian checklist (7)	Geography (8)	Notes (9)	Novelties (10)
Dasylirion serratifolium (Karw. ex Schult. & Schult.f.) Zucc.		ACCL	DD	?	–	–	Mexico		
Datura inoxia Mill.	*Datura meteoloides* DC. in Dunal	ADV	CAS	≈	INV	–	N-Amer, Mexico		R+
Datura metel L.		ADV	,	↓	–	–	Trop-Subtrop		
Datura stramonium L.		NAT	NAT	≈	INV	NAT	Not known		
Dichondra micrantha Urb.		ADV	CAS	≈	NAT	NAT	China, Jap		
Dimorphotheca ecklonis DC.	*Osteospermum ecklonis* (DC.) Norl.	ADV	CAS	≈	CAS	CAS	S-Afr		
Diospyros lotus L.		ADV	DD	?	NAT	–	Asia, Jap		
Dolichandra unguis-cati (L.) L.G.Lohmann	*Macfadyena unguis-cati* (L.) A.H.Gentry	NAT	NAT	≈	CAS	CAS	Brazil		NS
Echium lusitanicum L.		ADV	DD	?	–	–	Iberia		
Echium candicans L.f.	*Echium fastuosum* Jacq.	ACCL	CAS	↑	NAT	CAS	Canary Is		
Echium wildpretii H.Pearson ex Hook.f.		ADV	–	↓	–	–	Canary Is		
Enchylaena tomentosa R.Br.		NAT	NAT	≈	CAS	CAS	Australia		NS
Ephedra altissima Desf.		NAT	NAT	≈	–	–	N-Afr		+
Erigeron karvinskianus DC.		NAT	NAT	≈	INV	INV	S-Afr		
Erigeron sumatrensis Retz.	*Conyza albida* Willd. ex Spreng.	NAT	INV	↑	INV	INV	CS-Amer		
Erysimum cheiri (L.) Crantz		NAT	NAT	≈	NAT	NAT	Culta		
Eschscholzia californica Cham. subsp. *californica*	*Eschscholzia californica* Cham.	ADV	CAS	≈	CAS	CAS	N-Amer		
Eucalyptus globulus Labill. subsp. *globulus*		ADV	CAS	≈	NAT	CAS	Australia		
Eugenia uruguayensis Cambess.	*Eugenia guabiju* O.Berg	ADV	CAS#	≈	–	–	Argent		(+)
Ferula communis L. subsp. *communis*		NAT	C	nr	NATIVE	NATIVE	Medit		RNS
Ficus carica L.		NAT	NAT	≈	NATIVE	NATIVE	SE-Medit, Middle East	(m)	
Freesia leichtlinii Klatt subsp. *alba* (G.L.Mey.) J.C.Manning & Goldblatt	*Freesia refracta* (Jacq.) Eckl. ex Klatt	ADV	CAS	≈	NAT	CAS	S-Afr	(n)	
Freylinia lanceolata (L.f.) G.Don		ADV	DD	?	–	–	S-Afr		
Genista canariensis L.	*Cytisus canariensis* (L.) Steud.	ADV	DD	?	–	–	Canary Is		
Genista linifolia L.		NAT	NAT	≈	C	NAT	W-Medit		
Geranium palmatum Cav.		ADV	CAS#	≈	–	–	Canary Is		(+)
Geranium sanguineum L.	*Geranium sanguineum* L. var. *sanguineum*	NAT	NAT	≈	NATIVE	NATIVE	Eur-Cauc, Asia Minor		
Glandularia tenera (Spreng.) Cabrera	*Verbena tenera* Spreng. var. *pulchella* (Sweet) Sims	ADV	–	↓	CAS	–	S-Amer		

Taxon (1)	Previous names [1996] (2)	Cat 1996 (3)	2022 (4)	Trend (5)	Italian checklist (6)	Ligurian checklist (7)	Geography (8)	Notes (9)	Novelties (10)
Glebionis segetum (L.) Fourr.	*Chrysanthemum segetum* L.	ADV	CAS	≈	NATIVE	NATIVE	SW-Asia		
Glottiphyllum linguiforme (L.) N.E.Br.		NAT	CAS#	↓	–	–	S-Afr		(+)
Heliotropium amplexicaule Vahl		ADV	CAS	≈	NAT	CAS	Brazil		
Helleborus lividus Aiton subsp. *corsicus* (Briq.) P.Fourn.	*Helleborus lividus* Aiton subsp. *corsicus* (Briq.) Yeo	ADV	–	↓	NATIVE	–	Corsica-Sardinia		
Hesperocyparis lusitanica (Mill.) Bartel	*Cupressus lusitanica* Mill.	NAT	DD	?	–	–	C-Amer		
Hibiscus trionum L.		ADV	–	↓	NAT	NC	S-Medit, SW-Asia		
Hypericum canariense L.		ADV	CAS#	≈	–	–	Canary Is		(+)
Impatiens balsamina L.		ADV	CAS?	≈	CAS	CAS	China, India		
Ipomoea indica (Burm.) Merr.		ADV	CAS	≈	INV	INV	CS-Amer		
Iris germanica L.		ADV	CAS	≈	NAT	NAT	Medit, Middle East		
Jaborosa integrifolia Lam.		ADV	CAS#	≈	CAS	–	Argent		R(+)
Jacaranda mimosifolia D.Don		ADV	CAS#	≈	CAS	–	Argent		R(+)
Jasminum mesnyi Hance		ADV	CAS#	≈	NAT	–	China		R(+)
Koelreuteria bipinnata Franch.	*Koelreuteria bipinnata* Franch. var. *integrifolia* (Merr.) T.C.Chen	ADV	CAS	≈	–	–	China		+
Laburnum anagyroides Medik. subsp. *anagyroides*	*Laburnum anagyroides* Medik.	ADV	CAS?	≈	NATIVE	NATIVE	CS-Eur		
Lantana camara L. subsp. *aculeata* (L.) R.W.Sanders	*Lantana camara* L.; *L. camara* 'Hybrida'	NAT	CAS#	↓	NAT	–	Trop Amer		R(+)
Lathyrus oleraceus Lam. subsp. *oleraceus*	*Pisum sativum* L. subsp. *sativum*	NAT	DD	?	CAS	–	S-Eur, Medit		
Laurus nobilis L.		NAT	NAT	≈	NATIVE	NATIVE	Medit		
Lavandula dentata L.		ADV	CAS	≈	CAS	–	W-Medit		R+
Leucojum vernum L.		NAT	NAT	≈	NATIVE	NATIVE	C-Eur		
Ligustrum lucidum W.T.Aiton		ACCL	NAT	↑	INV	NAT	China, Se-Asia		
Limoniastrum monopetalum (L.) Boiss.		ADV	CAS	≈	NATIVE	–	Medit, Iberia		R+
Linaria purpurea (L.) Mill.		NAT	DD	?	NATIVE	–	CS-IItaly, Sicily		
Linum narbonense L.		NAT	DD	?	NATIVE	NATIVE	W-Medit, SW-Eur		
Lobelia erinus L.		ADV	CAS	≈	CAS	CAS	S-Afr		
Lunaria annua L.		NAT	NAT	≈	NATIVE	NATIVE	SE-Eur		
Lychnis coronaria (L.) Desr.		ADV	DD	?	NATIVE	NATIVE	SE-Eur, Himalaya		

Taxon (1)	Previous names [1996] (2)	Cat 1996 (3)	2022 (4)	Trend (5)	Italian checklist (6)	Ligurian checklist (7)	Geography (8)	Notes (9)	Novelties (10)
Lycianthes rantonnetii (Carrière) Bitter	*Solanum rantonnetii* Carrière	ADV	CAS	≈	NAT	CAS	S-Amer		
Macleaya cordata (Willd.) R.Br.		ADV	–	↓	–	–	China, Jap		
Malcolmia chia (L.) DC.		ADV	–	↓	–	–	E-Medit		
Malcolmia maritima (L.) W.T.Aiton	*Malcolmia maritima* (L.) R.Br.	ADV	–	↓	NATIVE	CAS	E-Medit		
Maurandya barclayana Lindl.	*Asarina barclaiana* (Lindl.) Pennell	ADV	CAS#	≈	–	–	Mexico		(+)
Melissa officinalis L. subsp. *officinalis*		ADV	CAS#	≈	C	C	Turkey		
Mesembryanthemum cordifolium L.f.	*Aptenia cordifolia* (L.f.) Schwantes	NAT	–	↓	INV	CAS	S-Afr		
Mimosa polycarpa Kunth var. *spegazzinii* (Pirotta) Burkart	*Mimosa spegazzinii* Pirotta	ADV	–	↓	–	–	Argent		
Mirabilis jalapa L.		ADV	CAS	≈	INV	NAT	Trop Amer		
Muscari neglectum Guss. ex Ten.		ADV	CAS	≈	NATIVE	NATIVE	Eur, Middle East, N-Afr		
Myoporum insulare R,Br.	*Myoporum tenuifolium* G.Forst.	ACCL	CAS	↑	INV	CAS	Australia		
Myosotis alpestris F.W.Schmidt		ADV	DD	?	NATIVE	NATIVE	Euras, N-Amer		
Nandina domestica Thunb.		ACCL	CAS#	↑	CAS	–	China, Jap, India		R(+)
Nephrolepis cordifolia (L.) C.Presl		ADV	CAS	≈	NAT	NAT	Asia, Australia		
Nicotiana glauca Graham		NAT	NAT	≈	INV	CAS	S-Amer		RNS
Nicotiana tabacum L.		NAT	CAS?	↓	CAS	–	Unknown		
Nigella damascena L.		NAT	NATIVE	nr	NATIVE	NATIVE	Medit, Asia Min, Canar		
Nothoscordum gracile (Aiton) Stearn		–	CAS	↑	INV	CAS	CS-Amer	(o)	
Oenothera biennis L.		ADV	–	↓	NAT	CAS	N-Amer		
Oenothera rosea L'Hér. ex Aiton		NAT	NAT	≈	CAS	CAS	Amer		RNS
Olea europaea L.	*Olea europaea* L. *subsp. europaea*	ADV	NAT	↑	NATIVE	NATIVE	Culta		
Opuntia ficus-indica (L.) Mill.		ACCL	NAT	↑	INV	NAT	Mexico	(p)	
Oxalis articulata Savigny		NAT	NAT	≈	INV	NAT	S-Amer		
Oxalis bowiei W.T.Aiton ex G.Don	*Oxalis purpurata* Jacq.	ADV	CAS	≈	NAT	–	S-Afr		R+
Oxalis corniculata L.		?NAT	NAT	≈	C	C	SE-Asia		
Oxalis pes-caprae L.		NAT	NAT	≈	INV	INV	S-Afr	(q)	
Oxypetalum coeruleum (D.Don ex Sweet) Decne.		ADV	DD	?	–	–	S-Amer		
Pallenis maritima (L.) Greuter	*Asteriscus maritimus* (L.) Less.	NAT	NAT	≈	NATIVE	NATIVE	S-Medit, Canary Is		

Taxon (1)	Previous names [1996] (2)	Cat 1996 (3)	2022 (4)	Trend (5)	Italian checklist (6)	Ligurian checklist (7)	Geography (8)	Notes (9)	Novelties (10)
Papaver commutatum Fisch., C.A.Mey. & Trautv.		ADV	DD	?	–	–	Cauc, Asia Minor		
Papaver somniferum L.	*Papaver somniferum* L. subsp. *somniferum*	ADV	DD	?	NAT	CAS	Euras		
Paraserianthes lophantha (Willd.) I.C.Nielsen subsp. *lophantha*	*Albizia lophantha* (Willd.) Benth.	ADV	CAS	≈	NAT	NAT	Australia		
Parrotia persica (DC.) C.A.Mey.		ACCL	CAS	?	–	–	Iran		+
Paspalum dilatatum Poir.		NAT	NAT	≈	INV	NAT	S-Amer		
Passiflora bryonioides Kunth	*Passiflora bryonioides* Humb., Bonpl. & Kunth	ADV	–	↓	–	–	CN-Amer	(r)	
Passiflora caerulea L.		ADV	CAS	≈	NAT	CAS	S-Amer		
Passiflora morifolia Mast.		–	CAS#	↑	NAT	–	Mexico	(s)	R(+)
Paulownia tomentosa (Thunb.) Steud.		ADV	CAS	≈	INV	CAS	China		
Peltaria turkmena Lipsky		ADV	DD	?	–	–	E-Eur, W-Asia		
Periploca graeca L.		ADV	CAS	≈	C	C	E-Medit		
Persicaria capitata (Buch.-Ham. ex D.Don) H.Gross		ADV	CAS	≈	NAT	CAS	Himalaya		
Petasites pyrenaicus (L.) G.López	*Petasites fragrans* (Vill.) C.Presl	NATIVE	NAT	nr	NATIVE	NAT	C-Medit		
Petunia atkinsiana (Sweet) D.Don ex W.H.Baxter	*Petunia -Hybrida*	ADV	CAS	≈	NAT	CAS	Culta		
Phlomis fruticosa L.		ADV	DD	?	NATIVE	–	CNE-Medit		
Phoenix canariensis H.Wildpret	*Phoenix canariensis* hort. ex Chabaud	ADV	CAS	≈	NAT	CAS	Canary Is		
Photinia arbutifolia Lindl.	*Heteromeles arbutifolia* (Aiton) M.Roem.	ADV	CAS?	≈	–	–	N-Amer		
Physalis peruviana L.		ADV	–	↓	NAT	CAS	CS-Amer		
Phytolacca americana L.		NAT	NAT	≈	INV	INV	N-Amer		
Pinus canariensis C.Sm. ex DC.		ADV	CAS	≈	NAT	CAS	Canary Is		
Pinus pinea L.		ADV	CAS	≈	NAT	NAT	Medit		
Pittosporum phillyreoides DC.		ACCL	CAS#	↑	–	–	Australia		(+)
Pittosporum tobira (Thunb.) W.T.Aiton		NAT	NAT	≈	NAT	NAT	China, Jap		
Pittosporum undulatum Vent.		NAT	NAT	≈	CAS	CAS	Australia		NS
Pittosporum venulosum F.Muell.	*Pittosporum procerum* Naudin	ACCL	CAS	↑	–	–	Australia		+
Plumbago auriculata Lam.		ACCL	CAS?	↑	NAT	CAS	S-Afr		
Polanisia trachysperma Torr. & A.Gray	*Polanisia dodecandra* (L.) DC.	ADV	–	↓	NAT	CAS	N-Amer		
Polygala myrtifolia L.		ADV	CAS?	≈	CAS	CAS	S-Afr		
Portulaca oleracea L.	*Portulaca oleracea* L. subsp. *oleracea*	NATIVE	CAS?	nr	C	C	Medit, Macaronesia, Africa		
Prunus cerasifera Ehrh.		NAT	CAS?	↓	NAT	NAT	Se-Eur, Asia Minor		

Taxon (1)	Previous names [1996] (2)	Cat 1996 (3)	2022 (4)	Trend (5)	Italian checklist (6)	Ligurian checklist (7)	Geography (8)	Notes (9)	Novelties (10)
Prunus cerasifera Ehrh. 'Atropurpurea'		ADV	CAS?	≈	–	–	Culta		
Pteris vittata L.		ADV	CAS	≈	NATIVE	NAT	Trop-Subtrop		
Ptilostemon gnaphaloides (Cirillo) Soják subsp. *gnaphaloides*		NAT	NAT	≈	NATIVE	NAT	S-Italy, NW Greece		
Pyracantha coccinea M.Roem.		ADV	CAS	≈	NATIVE	NAT	S-Eur, Asia Minor		
Quercus coccifera L.		ACCL	C	?	NATIVE	D	Medit		RNS
Quercus pubescens Willd. subsp. *pubescens*		ADV	NATIVE	nr	NATIVE	NATIVE	Eur-Cauc, Asia Minor		
Rhaphiolepis bibas (Lour.) Galasso & Banfi	*Eriobotrya japonica* (Thunb.) Lindl.	NAT	NAT	≈	NAT	NAT	Jap		
Rhaphiolepis umbellata (Thunb.) Makino		ACCL	CAS#	↑	CAS	–	Jap, Korea		R(+)
Rhombophyllum dolabriforme (L.) Schwantes		ADV	DD	?	–	–	S-Afr		
Ricinus communis L.		ADV	CAS	≈	INV	NAT	N-Afr, Middle East		
Robinia pseudoacacia L.		ADV	NAT	↑	INV	INV	N-Amer		
Roldana petasitis (Sims) H.Rob. & Brettell	*Senecio petasitis* (Sims) DC.	ACCL	NAT	↑	NAT	NAT	Mexico		
Romneya coulteri Harv.		ACCL	CAS#	↑	–	–	N-Amer		(+)
Rosa banksiae W.T.Aiton var. *normalis* Regel	*Rosa banksiae* R.Br. in W.T.Aiton var. *normalis* Regel	NAT	NAT	≈	CAS	CAS	China		NS
Rosa banksiae W.T.Aiton [var. *normalis*] f. *lutescens* Voss	*Rosa banksiae* R.Br. in W.T.Aiton f. *lutescens* Voss	ADV	CAS	≈	–	–	China		
Rosa brunonii Lindl.		NAT	NAT	≈	–	–	Himalaya		+
Rosa brunonii Lindl. 'La Mortola'		NAT	NAT	≈	–	–	Culta		
Salvia canariensis L.		ADV	CAS	≈	NC	–	Canary Is		NS, R+
Salvia coccinea Buc'hoz ex Etl.	*Salvia coccinea* Juss ex Murray 'Pseudococcinea'	ADV	CAS#	≈	–	–	Culta		(+)
Searsia lancea (L.f.) F.A.Barkley	*Rhus lancea* L.f.	ADV	DD	?	–	–	S-Afr		
Searsia pallens (Eckl. & Zeyh.) Moffett		DD	CAS	?	–	–	S-Afr		+
Senecio angulatus L.f.		NAT	INV	↑	INV	INV	S-Afr		
Senecio deltoideus Less.		NAT	INV	↑	CAS	CAS	S-Afr		NS
Senecio linifolius L.	*Senecio longifolius* L.	NAT	CAS	↓	W	–	S-Afr	(s)	+
Senecio pterophorus DC.		–	INV	↑	INV	INV	CS-Afr		
Setaria palmifolia (J.Koenig) Stapf		ASSIST	CAS#	↑	–	–	Trop-Asia-Australia		(+)
Sibthorpia europaea L.	*Cymbalaria pilosa* (Jacq.) L.H.Bailey	NAT	CAS#	↓	–	–	CS-Italy, Sardinia		(+)

Taxon (1)	Previous names [1996] (2)	Cat 1996 (3)	2022 (4)	Trend (5)	Italian checklist (6)	Ligurian checklist (7)	Geography (8)	Notes (9)	Novelties (10)
Silene pendula L.		ADV	DD	?	NATIVE	–	Italy		
Smyrnium olusatrum L.		NAT	NAT	≈	NATIVE	NATIVE	S-Eur-Medit, W-Asia, Canary Is		
Solanum aviculare G.Forst.		NAT	CAS	↓	CAS	CAS	Australia		
Solanum dulcamara L.		ADV	CAS	≈	NATIVE	NATIVE	Euras, N-Afr		
Solanum lycopersicum L.	*Lycopersicon esculentum* Mill.	ADV	CAS	≈	CAS	CAS	Peru		
Solanum robustum H.Wendl.		ADV	–	↓	–	–	Brazil		
Soleirolia soleirolii (Req.) Dandy		ADV	–	↓	NATIVE	CAS	Corsica-Sardinia		
Sollya heterophylla Lindl.		NAT	NAT	≈	CAS	CAS	Australia		NS
Sorbus domestica L.		NAT	NAT	≈	NATIVE	NATIVE	CS-Eur		
Staphisagria requienii (DC.) Spach subsp. *requienii*	*Delphinium requienii* DC. subsp. *requienii*	ADV	DD	?	NATIVE	CAS	France		
Stenotaphrum secundatum (Walter) Kuntze		ADV	CAS–	≈	NAT	CAS	Trop-Subtrop		
Styrax officinalis L.		ADV	DD	?	NATIVE	–	Greece, Asia Minor		
Sulla coronaria (L.) B.H.Choi & H.Ohashi	*Hedysarum coronarium* L.	NAT	NAT	≈	NATIVE	CAS	N-Afr, Iberia		RNS
Tagetes erecta L.	*Tagetes-patula*-L. 'Hybrida'	ADV	CAS	≈	CAS	CAS	Culta		
Tanacetum parthenium (L.) Sch.Bip.	*Chrysanthemum parthenium* (L.) Bernh.	ADV	CAS	≈	NATIVE	CAS	S-Eur-Cauc		
Tara spinosa (Feuillée ex Molina) Britton & Rose	*Caesalpinia spinosa* (Molina) Kuntze	ACCL	CAS	↑	CAS	–	S-Amer		R+
Tarenaya hassleriana (Chodat) Iltis	*Cleome hassleriana* Chodat; Cleome *houtteana* Schltdl.	ADV	–	↓	CAS	–	Brazil, Argent		
Tetrapanax papyrifer (Hook.) K.Koch	*Tetrapanax papyrifer* (Hook.) J.K.Koch	NAT	–	↓	CAS	–	Taiwan		
Teucrium fruticans L. subsp. *fruticans*	*Teucrium fruticans* L.	ADV	CAS	≈	NATIVE	NATIVE	Medit		
Thalictrum minus L.	*Thalictrum minus* L. subsp. *minus*	ADV	DD	?	NATIVE	NATIVE	N-Afr, Iberia		
Thapsia garganica L. subsp. *garganica*	*Thapsia garganica* L.	NAT	DD	?	NATIVE	–	S-Medit, Iberia		
Thunbergia coccinea Wall. ex D.Don	*Thunbergia coccinea* (Nees) Wall.	ADV	CAS#	≈	–	–	Burma, India		(+)
Toxicodendron pubescens Mill.	*Toxicodendron quercifolium* (Michx.) Greene	ADV	–	↓	CAS	–	N-Amer		
Trachelium caeruleum L. subsp. *caeruleum*		NAT	NAT	≈	INV	NAT	W-Medit, Iberia		
Trachelospermum jasminoides (Lindl.) Lem.		ACCL	CAS#	↑	CAS		Japan, Korea, China		R(+)
Trachelospermum jasminoides (Lindl.) Lem. 'Wilsonii'		ADV	–	↓	CAS	–	Culta	(t)	

Taxon (1)	Previous names [1996] (2)	Cat 1996 (3)	2022 (4)	Trend (5)	Italian checklist (6)	Ligurian checklist (7)	Geography (8)	Notes (9)	Novelties (10)
Tradescantia fluminensis Vell.	*Tradescantia fluminensis* Vell. em. G.Brückn.	NAT	NAT	≈	INV	INV	S-Amer		
Triticum aestivum L		ADV	CAS	≈	CAS	–	Unknown		R+
Tropaeolum majus L.		NAT	NAT	≈	INV	CAS	S-Amer		RNS
Tulipa clusiana Redouté	*Tulipa clusiana* DC. var. *clusiana*	NAT	CAS	↓	NAT	CAS	W-Asia		
Tulipa raddii Reboul	*Tulipa praecox* Ten.	NAT	CAS#	↓	NAT	CAS	Unknown		
Urtica urens L.		ADV	DD	?	NATIVE	NATIVE	Unknown		
Vachellia karroo (Hayne) Banfi & Galasso	*Acacia karroo* Hayne	ADV	CAS	≈	INV	–	CS-Afr	(u)	R+
Verbena bonariensis L.		ADV	CAS	≈	NAT	NAT	S-Amer		
Veronica austriaca L. subsp. *dentata* (F.W.Schmidt) Watzl		ADV	DD	?	–	–	Eur		
Viola arvensis Murray subsp. *arvensis*		ADV	DD	?	NATIVE	NATIVE	Eur		
Vitis labrusca L.		ADV	CAS#	≈	NAT	CAS	N-Amer		
Vitis vinifera L.	*Vitis vinifera* L. subsp. *vinifera*	ADV	CAS#	↓	NATIVE	NATIVE	Unknown		
Washingtonia filifera (Linden ex André) H.Wendl. ex de Bary	*Washingtonia filifera* (Linden ex André) H.Wendl.	ADV	CAS#	↓	NAT	CAS	N-Amer, Mexico		
Wigandia caracasana Kunth	*Wigandia urens* (Ruiz & Pav.) Choisy var. *caracasana* (Humb., Bonpl. et Kunth) Gibson	NAT	NAT	≈	NAT	NAT	C-Amer		
Wigandia kunthii Choisy	*Wigandia urens* (Ruiz & Pav.) Choisy var. *urens*	NAT	NAT	≈	NAT	NAT	Peru		
Xiphion xiphium (L.) M.B.Crespo, Mart.Azorín & Mavrodiev	*Iris xiphium* L.	ADV	CAS#	≈	NATIVE	CAS	SW-Eur, N-Afr		
Zanthoxylum americanum Mill.		ADV	–	↓	–	–	N-Amer		

(1) The nomenclature follows Portal to the Flora of Italy (2022). (2) The names used in the 1996 catalogue (Campodonico et al. 1996) if different from those reported in column 1. (3) Status according Campodonico et al. (1996). (4) New status according our assessment. (5) Trend of the status from 1996 to 2022. (6) Status in Italy according to Galasso et al. (2018a) and related updates. (7) Status in Liguria according Galasso et al. (2018a) and related updates. (8) Area of origin. (9) Additional information. (10) News with respect to the national and regional floras.

ACCL : Acclimated; ADV: Adventive; ASSIST; Assisted; C: Cryptogenic species; CAS: Occurring as a casual alien outside human-dominated systems; CAS#: Occurring as a casual alien in human-dominated systems, but without direct intervention by humans and not close to parent plant; CAS?: Occurring with an undefined invasion status, likely as casual alien; CULTA: Cultivated; D: Doubtfully occurring; DD: Data deficient; ERA: Locally eradicated; INV: Occurring as an invasive alien; NAT: Occurring as a naturalized alien outside human-dominated systems; NC: No longer recorded; W: wrong record; ≈ : No significant changes; ↓ : Trend towards population reduction; ↑ : Trend towards population growth; nr: trend not relevant.

Notes. The column 9 includes references to records on Wikiplantbase#Liguria (Barberis et al. 2021) and other informations: (a) Probably absent; reported by mistake in the past; (b) 3 Apr 2008 Longo D. (Barberis et al. 2021); (c) 9 Aug 2015 Blardoni (2016) (d) 15 Aug 2015 Blardoni (2016); (e) March 2016 Blardoni (2016); eradicated; (f) Recorded in the past by mistake as C. aethiopica; (g) 17 Aug 2015 Blardoni (2016); (h) The subsp. or var. glauca is clearly different compared to the subsp. valentina; (i) 17 Aug 2015 Blardoni (2016); (j) A. Gentile 1987 (Barberis et al. 2021); (k) in Liguria according to Di Turi and Aristarchi in Galasso et al. 2019b; (l) A. Gentile in Longo D. (Barberis et al. 2021); (m) Archaeophyte; (n) apr 2008 Longo D. (Barberis et al. 2021); (o) 14 Aug 2015 Blardoni (2016); (p) Aug 2008 Longo D. (Barberis et al. 2021); (q) recorded in the past by mistake; (r) in Sardegna (G. Bacchetta in Galasso et al. 2020a); (s) absent according Galasso et al. (2018a) because confused with S. inaequidens DC.; (t) the information for Italy is to be referred to the species in a general sense; (u) for Italy (Sardegna) according to Galasso et al. (2021a).

Novelties (column 10): +: new for the Italian alien flora; R+: new for the Ligurian alien flora; (+): probably, but not yet with certainty, new to the Italian alien flora; R(+): probably but not yet with certainty, new to the Ligurian alien flora; NS: new status proposed for the Italian alien flora; RNS new status proposed for the Ligurian alien flora.

Discussion and conclusions

The 1996 catalogue of the compendium listed 2,672 taxa; in the last thirty years this number varied between 2,500 and 3,000. The investigations carried out on 270 taxa recorded at the Area Protetta dei Giardini Botanici Hanbury (Capo Mortola, Ventimiglia, Italy) allowed us to record the current presence of 198 taxa of exotic origin, excluding cultivated or assisted taxa: 15 invasive, 65 naturalized, 76 casual, 37 occurring as casual in human-dominated systems, but without direct intervention by humans and not close to parent plant, 15 occurring as casual alien, but still with some uncertainties for a definitive classification. In addition to these, 3 species have been classified as cryptogenic and 1 as eradicated (extinct). In 1996, 229 species were reported: 87 naturalized and 142 adventitious (casual). 40 taxa show an increasing trend and 41 a decreasing or disappearing trend; 22 taxa reported as adventitious and 2 as naturalized in 1996 are no longer present or are present only with cultivated plants. On the other hand, numerous species, which in 1996 were classified as acclimated, have now become casual or naturalized. Regressive phenomena are also observed, which may depend, at least in part, on differences in the method of assessing status. The origin of the current alien flora of Capo Mortola is shown in Table 2: American taxa prevail with 21.8%; the Mediterranean and Mediterranean-Atlantic (including Macaronesian) ones are slightly less (20.7%). These are followed by Asian (15.7%), African (15.4% – mainly from South Africa), Eurasian (7.6%), and Australian/Australasian (6.6%) taxa.

Although an exact comparison with the national list (Galasso et al, 2018a) is not possible, because it does not consider taxa growing in botanic gardens, our study highlights 28 taxa that would be new to the Italian flora (25 casual and 3 naturalized) and 24 to the Ligurian flora (all casual) if we consider also the wild or neglected areas inside the botanical gardens. Many of these taxa will probably also be observed outside botanic gardens in the coming years. If we consider only the wild areas of Capo Mortola, 10 taxa are new to the Italian flora (7 casual and 3 naturalized) while 14 are new to the Ligurian flora only (all casual). In addition, 9 status changes are proposed on a national scale and 17 on a regional scale. Our study is the first in Italy to deal with the dynamics of invasion processes originating from botanic gardens. Over the past 25 years, 41 taxa that

Table 2. Origin of alien plants currently present in the study area (excluding cultivated or assisted taxa), listed in Table 1.

America	21.2%
Medit / Medit-Atl / Macaronesia	20.7%
Asia	15.7%
S-Africa / Africa / N-Africa	15.2%
Eur / Eur-Cauc / Euras /	7.6%
Australia / Australasia	6.6%
Culta	5.6%
Trop / subtrop	3.5%
Italy (other regions)	1.0%
Unknown	3.0%

Table 3. History of the introduction and the presence of a subset of taxa. **Sources.** Other sources: archival documents (currently kept for the most part at the Istituto Internazionale di Studi Liguri in Bordighera, Fondo Hanbury (henceforth IISL-FH), and, in part, at the Hanbury Botanic Gardens in Ventimiglia) and publications other than the following sources; S&P: Sowing & planting (handwritten records kept in IISL-FH); IS: Index seminum (Hanbury et al 1888; various authors 1890–1939); Cat1: Cronemayer (1889); Cat2: Dinter (1897); Cat3: Berger (1912); Cat4: Ercoli and Lorenzi (1938); Cat5: Campodonico et al (1996); 2022: this study.

Taxon	Other sources	S&P 1884–1907	IS 1888 1890–1939	Cat1 1889	Cat2 1897	Cat3 1912	Cat4 1938	Cat5 1996	2022
Acacia provincialis (*)	0	0	x	x	x	x	x	nat	nat
Acer oblongum	0	0	x	x	x	x	x	adv	cas#
Alectryon tomentosus	0	1897	0	0	0	x	x	adv	cas
Asparagus virgatus	0	1901	0	0	0	x	x	adv	cas
Brachychiton discolor	0	1893	0	0	0	x	x	accl	cas#
Bupleurum fruticosum	0	0	1888	x	x	x	x	nat	c
Chasmanthe bicolor (**)	1870	0	0	x	x	x	x	0	nat
Chasmanthium latifolium	1994	0	0	0	0	0	0	culta	cas#
Chrysanthemoides monilifera	1869	0	1888	x	x	x	x	nat	nat
Chrysojasminum humile	0	0	x	x	x	x	x	culta	nat
Clematis armandii	0	0	1917	0	0	0	x	accl	cas
Enchylaena tomentosa	0	1903	0	0	0	x	x	nat	nat
Ephedra altissima	1870	0	1890	x	x	x	x	nat	nat
Ferula communis subsp. *communis*	1868	0	1888	x	x	x	x	nat	c
Jaborosa integrifolia	1872	0	0	0	0	0	x	adv	cas#
Jasminum mesnyi	0	1903	0	0	0	x	x	adv	cas#
Kolreuteria bipinnata	1893	0	0	0	0	x	x	adv	cas
Lavandula dentata	0	0	1909	x	x	x	x	adv	cas
Nandina domestica	0	0	0	x	x	x	x	accl	cas#
Parrotia persica	0	0	0	x	x	x	x	accl	cas
Passiflora morifolia	1999	0	0	0	0	0	0	0	cas#
Pittosporum venulosum	0	1903	1912	0	0	x	x	accl	cas
Quercus coccifera	0	0	1896	x	x	x	x	accl	c
Roldana petasitis	0	0	0	0	x	x	x	accl	nat
Romneya coulteri	0	1899, 1901	0	0	x	x	x	accl	cas#
Rosa banksiae var. *normalis* f. *lutescens*	1870	0	0	x	0	x	x	adv	cas
Rosa banksiae var. *normalis f. normalis*	1912	0	1913	0	0	x	x	adv	nat
Rosa brunonii	0	0	1922	0	0	0	x	adv	nat
Rosa brunonii 'La Mortola'	0	0	0	0	0	0	x	nat	nat
Searsia pallens	0	0	1909	x	x	x	x	nat	cas
Senecio linifolius	1972	0	1888	x	x	x	x	nat	cas
Setaria palmifolia	0	0	0	x	x	x	x	assist	cas#
Trachelospermum jasminoides	0	0	1891	0	x	x	x	accl	cas#
Vachellia karroo	1867	0	1890	x	x	x	x	adv	cas

(*) before now mistakenly recorded as *A. retinodes;* (**) mistakenly recorded as *C. aethiopica.*

form this alien flora showed an increasing trend, while 41 taxa declined in the wild; 139 taxa showed no significant changes in their status. For 37 taxa, data are deficient, and an assessment of their status is now impossible. One species, *Baccharis halimifolia* L., was recently eradicated and appears to be extinct in nature. The local history of the presence of a sample group of 34 taxa (32 species), of which 11 are new to Italy or have a new sta-

tus, was analyzed (Table 3): 7 of these taxa were certainly introduced in the first 10 years from the foundation of the gardens in 1867, 17 in the following years of the 19th century, 8 in the first thirty years of the 20th century and 2 in the last decade of the same century. Excluding the cryptogenic species, only 10 of the remaining taxa are also reported in the exotic flora of the neighboring French PACA region. These data are preliminary, and it would be useful to extend the historical analysis and the comparison with the situation of the nearby Côte d'Azur to the complete set of species reported in Table 1.

We also tried to clarify the status of species recorded as native in Liguria in recent times, but whose native character was already questioned by botanists of the past. Our study represents a starting point for an analysis extended to all taxa over a wider area, in a territory that is very sensitive to the impact of invasions of exotic species on natural biodiversity, and for a comparison with neighboring France. The data obtained, although preliminary, do not show a worsening of the invasion process. Indeed, a specific evaluation protocol aimed at preventing the potential risk of escape of exotic species from the Giardini Botanici Hanbury and invasion of the surrounding areas was adopted in the last decade.

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